Net neutrality review

Consultation

Non-confidential version: [✂] marks confidential redactions

[Net neutrality review – Welsh overview](#)

Contents

1. Overview

'Net neutrality', sometimes referred to as the 'open internet', is the principle that users of the internet (both consumers and those making and distributing content) should be in control of what they see and do online – not the broadband or mobile providers that connect people and businesses to the internet (otherwise known as internet service providers or ISPs). The net neutrality rules make sure that the traffic carried across broadband and mobile networks is treated equally and particular content or services are not prioritised or slowed down so that some are favoured over others.

As the internet has become an essential part of our daily lives, net neutrality has played a critical role in allowing people to access the content and services they want, from web browsing to watching streaming videos to uploading content on social media. It has also enabled new content providers to reach millions of new customers and achieve scale quickly – for example, four years after its UK launch, TikTok had almost 19 million UK adult visitors.

However, because the net neutrality rules constrain the activities of the ISPs, they may be seen as restricting their ability to innovate, develop new services and manage their networks. This could lead to poor consumer outcomes, including consumers not benefiting from new services as quickly as they should, or at all. These potential downsides might become more pronounced in the future, as people's use of online services expands, traffic increases, and more demands are placed on networks.

We want to make sure that as technology evolves and more of our lives move online, net neutrality continues to support innovation, investment and growth, by both content providers and ISPs. Getting this balance right will improve consumers' experiences online, including through innovative new services and increased choice.

The current net neutrality rules are set out in legislation that was carried over from the UK's membership of the European Union (EU). Any changes to the rules in future would be a matter for Government and Parliament. Ofcom is responsible for monitoring and ensuring compliance with the rules and providing guidance on how ISPs should follow them. Last year, we started a review of the UK's net neutrality framework. In this document, we set out our assessment of the issues that have been raised with us and propose revised guidance on how the rules should apply.

What we are proposing:

In general, net neutrality has worked well and supported consumer choice as well as enabling content providers to deliver their content and services to consumers. However, there are specific areas where we propose more clarity in our guidance to enable ISPs to innovate and manage their networks more efficiently, to improve consumer outcomes:

- **ISPs can offer premium quality retail offers:** Allowing ISPs to provide premium quality retail packages can better meet some consumers' needs. For example, people who use high quality virtual reality applications may want to buy a premium quality service, while users who mainly stream and browse the internet could buy a cheaper package. We propose new guidance clarifying that ISPs can offer premium packages, for example offering low latency, as long as they are sufficiently clear to customers about what they can expect from the services they buy.
- **ISPs can develop new 'specialised services':** New 5G and full fibre networks offer the opportunity for ISPs to innovate and develop their services. We propose guidance to clarify when they can provide 'specialised services' to deliver specific content and applications that need to be optimised, which might include virtual reality and driverless vehicles.
- **ISPs can use 'traffic management' measures to manage their networks:** Traffic management can be used to manage congestion on networks so that a good quality of service is maintained for consumers, and so we propose guidance to clarify when ISPs can do this.
- **Most zero-rating offers will be allowed:** Zero-rating is where the data used by certain websites or apps is not counted towards a customer's overall data allowance. We propose to update our guidance to make clear we will generally allow these offers, while setting out the limited circumstances where we might have concerns.

We also propose to clarify our approach to enforcement where there is clear public benefit. This includes enabling ISPs to prioritise and zero-rate access to emergency services, offer parental controls, and manage internet traffic on aeroplanes and trains where there is limited capacity available.

We set out views on a further set of issues where there may be a case for giving ISPs further flexibility in future but which are not permitted under the current rules. These would be a matter for Government to consider as they would require legislative change. These are:

- Allowing retail packages in which different content is provided to different quality standards, for example a package that only has a specific gaming application with guaranteed low latency;
- Allowing greater flexibility to apply traffic management to specific content to address congestion; and
- Allowing zero-rated content to continue to be accessed after a customer's general data allowance has been exhausted.

Finally, we set out our views on the possibility of allowing ISPs to charge content providers for carrying traffic, which might lead to more efficient use of networks. While there are potential benefits to a charging regime, we have not yet seen sufficient evidence that this is needed and believe there is sufficient flexibility provided for ISPs in our other proposals. Ultimately whether or not a charging regime should be introduced in the UK is a decision for Government and Parliament.

Background to our review

The net neutrality rules were introduced into EU law in 2016. Following the UK leaving the EU (and the end of the transition period), the rules, with minor alterations, became part of UK domestic law.

Since the rules were introduced, there has been a significant evolution of the internet ecosystem:

- Traffic volumes have increased significantly, driving investment by ISPs to continue to deliver the traffic being consumed by their customers.
- A large share of internet traffic is related to several large content providers that have emerged or grown in scale, such as Netflix and Amazon Prime.
- There are other providers in the value chain that also hold gatekeeper positions and control the content accessed by consumers, such as Apple and Google through the iOS and Android operating systems embedded in smart phones.
- Technology is evolving so that both fixed and 5G networks offer the opportunity to deliver a range of new and innovative services. For example, new augmented reality and virtual reality experiences that offer different ways to interact with others and the environment.

These developments have led to competing views on the effectiveness of the current net neutrality framework. ISPs, including mobile network operators, argue that the rules mean they are not able to innovate and recover appropriate costs from the content providers that are driving traffic on their networks. Conversely, content providers argue that the rules are necessary to support innovative services, and that they themselves invest heavily in their own networks to deliver traffic more efficiently.

Our objectives for the review are to: (1) safeguard citizens' and consumers' access to an open internet, so that users are able to access and use online content, apps and services of their choice, and also distribute lawful information online; (2) to safeguard the open internet as an engine of innovation, so that providers of online content, apps and services have strong incentives to continuously innovate; and (3) to safeguard well-run, efficient and robust networks.

This review is taking place at an important time in the development of regulatory approaches to online services. Ofcom has recently set out its approach to engaging in digital markets in the communications sector and how this fits within the evolving UK regulatory framework.[1] This review is a key part of our work in digital markets. It also complements the recent work of the CMA in digital markets, in particular its examination of mobile ecosystems. In addition, the Government is undertaking its Wireless Infrastructure Strategy Review – our review recognises the importance of clarity in allowing ISPs the opportunity to realise the potential for innovation offered by 5G.

Next Steps

We invite responses by **13 January 2023** and expect to publish our statement in autumn 2023.

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[1] Ofcom, 2022. *Digital markets in the communications sector: Ofcom's approach to competition and consumer issues in internet-based communications markets*.

2. Introduction and background

2.1   'Net neutrality', sometimes referred to as the 'open internet', is the principle that users of the internet (both consumers and those making and distributing content) should be in control of what they see and do online – not the broadband or mobile providers that connect people and businesses to the internet (otherwise known as internet service providers or ISPs). The net neutrality rules make sure that ISPs treat the traffic that is carried across their networks equally and that particular content or services are not prioritised or slowed down so that some are favoured over others.

2.2   The internet is an essential part of our daily lives and net neutrality has played a critical role in making sure people can access the content and services they want, and enabling content and service providers to reach users and audiences online. Reliance on the internet will continue to grow as technology evolves and develops, with services such as mobile 5G, cloud computing, the internet of things (IoT) and future developments like the metaverse offering new benefits to consumers and businesses and changing how we interact online.

2.3   We want to make sure that as technology evolves and more of our lives move online, net neutrality continues to support innovation, investment and growth, by both content providers and ISPs. Getting this balance right will improve consumers' experiences, including through innovative new services and increased choice.

2.4   In September 2021, we published a call for evidence (the '2021 Call for Evidence') setting out our plans to review how the UK's net neutrality framework is functioning. We received 36 responses, from a range of stakeholders, including ISPs, content and application providers (CAPs), consumer and/or citizen organisations, trade associations and academics.[2]

2.5   We have considered all the responses and have carried out further information gathering and analysis, including sending out formal requests for information (RFIs) to key players in the internet value chain and holding stakeholder meetings. We also commissioned qualitative and quantitative research into residential and small business users' views on the UK net neutrality rules.[3]

2.6   In this section, we:

- describe the current net neutrality regulatory framework;

- outline Ofcom's duties and powers;

- set out the purpose and scope of the review;

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[2] All non-confidential responses are available on our website here.
[3] Ofcom, 2022. *SME consumer experience in the communications market*; Oxygen, 2022. *Qualitative Research Report on Net Neutrality.* Subsequent references are to these publications.

- note the links with other Ofcom work, and UK government and international developments;

- summarise our approach to impact assessments, including our equality impact assessment; and

- detail the structure of this document.

Current Regulatory Framework

Open Internet Access Regulation

2.7   Rules aimed at protecting the principle of the open internet (the 'Regulation',[4] also referred to as the 'net neutrality rules') were agreed by the EU in 2015 when the UK was still a member and came into force at the end of April 2016.[5] The net neutrality rules became part of domestic UK law at the end of 2020.

2.8   The net neutrality rules aim to "safeguard equal and non-discriminatory treatment of traffic in the provision of internet access services and related end users' rights" and to "guarantee the continued functioning of the internet ecosystem as an engine of innovation".[6]

2.9   Internet access services are defined in Article 2 of the Regulation as follows:[7]

> *'internet access service' means a publicly available electronic communications service that provides access to the internet, and thereby connectivity to virtually all end points of the internet, irrespective of the network technology and terminal equipment used.*

2.10   The net neutrality rules protect end users'[8] rights to access and distribute information and content, use and provide applications and services, and use the terminal equipment of their choice via their internet access service.[9]

2.11   The rules achieve these aims by limiting the actions of ISPs. In order to access content on the internet, consumers sign up with an ISP to provide connectivity, and CAPs need to be able to access the customers of these ISPs in order to distribute their content. This places ISPs in a gatekeeper position. ISPs could try to use this position to exert control over the content their end users can access. For example, they could discriminate against a

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[4] *Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and retail charges for regulated intra-EU communications and amending Directive 2002/22/EC and Regulation (EU) No 531/2012*, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02015R2120-20201221 [accessed 18 Oct 2022]. The rules were reviewed by the European Commission in 2019 and its findings are in this report.

[5] Prior to the introduction of the net neutrality rules, most of the major UK ISPs had signed up to the Open Internet Code of Practice.

[6] Recital (1) of the Regulation.

[7] Article 2(2) of the Regulation.

[8] 'End users', in this context, include residential and business consumers, as well as CAPs.

[9] The rules cover all 'publicly available' fixed and mobile electronic communications services, 'which provide access to the internet, and thereby connectivity to virtually all end points of the internet'. They do not apply to wholly private services.

particular CAP's traffic, limit business and residential users' access to legal content or place restrictions on the devices that consumers can use to access content. The rules are designed to prevent such activities.

2.12 As set out in Section 3, there are other providers in addition to ISPs in the internet ecosystem. These providers are also in a position to influence the content that consumers can access (such as by controlling the applications that can be supported on end users' devices), but the rules do not apply to entities other than ISPs.

The requirements on ISPs under the current regulatory framework

2.13 The Regulation applies various rules to the activities of ISPs. The key relevant requirements are detailed below.

Open internet access and traffic management

- ISPs should not enter into agreements with end users based on, for example, commercial or technical conditions, or engage in commercial practices, which limit end users' rights to access and distribute the information of their choosing using the equipment of their choice.

- ISPs should treat all traffic equally when providing internet access services, but they are allowed to use 'reasonable' traffic management measures when certain conditions are met, i.e. on the basis these measures are:

  – based on objectively different quality of service requirements, rather than commercial considerations;
  – transparent, non-discriminatory and proportionate; and
  – not maintained for longer than necessary and do not monitor specific content.

- ISPs should not engage in any other forms of traffic management (e.g. blocking, throttling, discriminating between content providers etc.) apart from in very limited cases, including: traffic management to comply with a legal requirement; to preserve network integrity and security; and/or to prevent impending network congestion and manage exceptional or temporary network congestion.

Specialised services

- In addition to general internet access services, ISPs are permitted to offer specifically optimised services, known as 'specialised services'. If the relevant conditions are met, these services are not internet access services, and therefore the open internet access and traffic management rules above do not apply to them. The conditions include that:

  – optimisation is necessary in order to meet requirements of a specific level of quality;
  – the network capacity is sufficient to provide these services in addition to any internet access service offered;
  – the services are not offered as a replacement for internet access services; and

– they are not detrimental to the availability or general quality of internet access services for end users.[10]

<u>Transparency</u>

- ISPs must comply with several transparency measures relating to information within customer contracts, e.g. contracts should include details of download / upload speeds, traffic management policies and remedies available to consumers if they experience performance issues with their internet access service.

BEREC Guidance

2.14   The Body of European Regulators for Electronic Communications (BEREC) has published Guidelines on the Implementation of the EU Open Internet Access Regulation (the 'BEREC Guidelines').[11]

2.15   The UK is no longer a member of the EU and Ofcom is no longer required to "take utmost account of" the BEREC Guidelines following the end of the transition period. The guidelines will remain informative, and we can continue to reference them where we consider this to be appropriate. However, in so far as we propose our own guidance, then our guidance will take precedence if there is a conflict.

Changes in net neutrality rules in the UK following the UK's withdrawal from the EU

2.16   The UK left the EU on 31 January 2020, with a transition period until 31 December 2020. Following the end of this period, the EU rules on net neutrality became part of domestic UK law.[12] A number of small changes were made to the rules, so as to deal with minor issues arising from the UK's withdrawal from the EU.[13] For example, Ofcom is no longer required to take utmost account of the BEREC Guidelines or to submit an annual compliance report to the European Commission (although we are still required to publish a report). References to EU laws and national regulatory authorities (NRAs) were also deleted or replaced with references to national laws and Ofcom, respectively.

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[10] See Article 3(5). Examples of specialised services noted include linear (live) broadcasting IPTV services with specific quality requirements, VoLTE (high-quality voice calling on mobile networks) and real-time health services (e.g. remote surgery).

[11] BEREC, 2022. *BEREC Guidelines on the Implementation of the Open Internet Regulation.* Originally adopted in 2016, the BEREC Guidelines were updated in June 2020 to provide additional clarification to stakeholders and to take account of experiences by NRAs in applying these. In June 2022, the guidelines were updated again to largely reflect changes in its approach to zero rating offers.

[12] As retained EU law, the net neutrality rules will be subject to the process of revocation and reform announced by the Government in September 2022, see The Retained EU Law (Revocation and Reform) Bill 2022.

[13] See The Open Internet Access (Amendment etc.) (EU Exit) Regulations 2018, made pursuant to Section 8(1) of the EU Withdrawal Act 2018.

Ofcom's duties and powers

2.17   Ofcom's principal duty is to further the interests of citizens in relation to communications matters and to further the interests of consumers in relevant markets, where appropriate by promoting competition.[14]

2.18   In doing so, we are required to secure, among other things, the availability throughout the UK of a wide range of electronic communications services.[15] Along with other considerations, we must also have regard to the desirability of promoting competition in relevant markets; encouraging investment and innovation in relevant markets; and encouraging the availability and use of high speed data transfer services throughout the UK.[16] In considering how best to fulfil our general duties, we also have regard, where appropriate, to the need for the efficient provision of network access and services.[17]

2.19   In relation to net neutrality, we are explicitly required to promote the continued availability of non-discriminatory internet access services at levels of quality that reflect advances in technology.[18]

2.20   We also play an important role in ensuring that consumers can effectively exercise their rights under the relevant net neutrality rules and that ISPs comply with these. In particular, we have a duty to "closely monitor and ensure compliance" with the Regulation, and we must also publish annual reports with findings from our monitoring.[19]

2.21   The rules and our monitoring and enforcement activities need to be consistent with relevant international agreements between the UK and other countries. For example, the UK's trade agreement with the EU includes specific principles about internet users being able to:[20]

- access and distribute information and content, use and provide applications and services of their choice, subject to non-discriminatory, reasonable, transparent and proportionate network management; and
- use devices of their choice, as long as these do not harm the security of other devices, the network or services provided over the network.

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[14] Section 3(1) of the Communications Act 2003 (the 'Act').
[15] Section 3(2) of the Act.
[16] Section 3(4) of the Act.
[17] Section 3(4)(d), 3(4)e), 4(7) and (8) of the Act.
[18] Article 5(1), the Regulation.
[19] Article 5(1), the Regulation. These reports can be found on Ofcom's website here.
[20] Article 178 of the Trade and Cooperation Agreement between the European Union and the European Atomic Energy Community, of the one part, and the United Kingdom of Great Britain and Northern Ireland, of the other part. More high-level provisions are included in several other UK trade agreements, including with Japan and the EEA/EFTA states (Iceland, Liechtenstein and Norway). Article 178 also makes clear that the UK and the EU may adopt measures with the aim of protecting public safety with regards to users online.

Ofcom Framework for assessing compliance

2.22   Ofcom published its own approach to assessing compliance with certain areas of the net neutrality rules (the 'Framework document') in 2019.[21] This outlines the frameworks that we generally apply for assessing compliance of ISPs' zero-rating offers and traffic management measures with the Regulation.[22]

2.23   We have carried out a range of monitoring and enforcement activity since the rules came into effect, particularly in relation to ISPs' traffic management measures, zero-rating offers and terminal equipment restrictions. Both our Framework document and our annual compliance reports summarise a number of cases that we have assessed.[23]

Ofcom's role in assessing the net neutrality framework

2.24   As the net neutrality rules are set out in legislation, we cannot make changes to these. Any changes would be a matter for Government and ultimately Parliament. However, we can issue UK guidance on how we will assess ISPs' compliance with the current rules.[24] If we identify areas in which changes to legislation could deliver benefits to consumers, we will present these as independent findings.

Purpose and scope of the review

Purpose of the review

2.25   People and businesses have become more reliant on the internet. It is now essential for keeping people connected so they can work and study from home or on the go, stay in touch with friends and family, and be entertained. It also provides the infrastructure that supports both public and private sector enterprises in how they operate their businesses, and interact with their staff, customers and other organisations.

2.26   Users' expectations of what they can and should be able to do on the internet have expanded. They expect to be able to use video on demand, high quality livestreaming, and video calling in and out of the home, as well as online gaming applications. We are also beginning to see new augmented reality/virtual reality experiences in both consumer and business contexts, offering novel and interesting ways to interact with others and the environment.

2.27   To meet these new demands, fixed networks, mobile networks, and CAPs are offering new and innovative services. CAPs are investing in bringing new content and functionality into homes and workplaces, and network operators are making further investments in their

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[21] Ofcom, 2019. _Ofcom's approach to assessing compliance with net neutrality rules_ (the 'Framework' document). Subsequent references are to this publication.

[22] Zero-rating is a commercial practice whereby an ISP does not subtract data usage associated with a particular application (e.g. Facebook) or category of applications (e.g. social media) from a customer's monthly data allowance. The Framework document also briefly sets out our approach to the prohibition on restrictions on the use of terminal equipment (e.g. tethering).

[23] See sections 3 and 5 of the Framework document. Our previous annual monitoring reports can be found here.

[24] This includes updating or replacing our existing Framework document.

infrastructure to meet demand, deploying new network equipment, changing their network configurations and developing business models to fund these changes.

2.28   In this context, innovation and investment by CAPs, ISPs and other providers is integral to promoting a vibrant and dynamic digital sector. However, providers across the value chain have different views on how the net neutrality framework is working in this regard. ISPs have set out arguments for changes to the regime, while CAPs in general consider that it is working effectively.

2.29   We want to make sure that net neutrality continues to support innovation, investment and growth, by both content providers and ISPs. Getting this balance right will improve consumers' experiences online, including through innovative new services and increased choice.

2.30   There have also been developments internationally that have made our review timely. First, the UK's departure from the EU provides an opportunity to review the effectiveness of the net neutrality framework and consider whether any changes are required. Second, there is a live international debate about the future of net neutrality and the related issue of charging for network access and the funding of telecoms networks.[25]

Scope of our review

2.31   Last year we commenced our net neutrality review with our 2021 Call for Evidence. That document, and the responses to it, have shaped the scope of the review set out in this consultation.

2.32   In our review we have focused on how the current UK net neutrality framework is functioning, including:

   i)   how well the framework has worked in delivering good outcomes and achieving our policy objectives (as set out in Section 4);

   ii) what aspects of the framework could be clarified to enhance outcomes (e.g. by providing updated guidance on how the current rules should apply); and

   iii) if there are other areas that may offer positive outcomes for consumers and citizens, in which case we will present these as independent findings for Government and others to consider.

2.33   In our 2021 Call for Evidence, we noted a number of issues and areas we would look into as part of our review. In reviewing the regulatory framework and the argumentation and evidence received, we have identified several areas for more detailed review, including how to approach zero-rating, traffic demands on ISP networks, specialised services, terminal equipment and other exceptions to the rules.

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[25] Annex 7 of this document sets out details of different countries' approaches to net neutrality.

2.34   While the review is quite broad in scope, as set out in our 2021 Call for Evidence it does not currently include consideration of specific requirements relating to personal data, privacy and contract information.

2.35   We have published our 2022 report for monitoring compliance with the Open Internet Regulation (the 'Annual monitoring report') in this document (see Annex 6). We have given further thought to how we will monitor and report on net neutrality in light of our proposals in this document and consider it further in sections 5 to 9, where relevant. More generally, we will review the format of future reports, once we have reached conclusions in this review.

Links with other work

2.36   This review is taking place at an important time in the development of regulatory approaches to online services in the UK and abroad.

2.37   It is part of a wider suite of interrelated work that Ofcom and other organisations are carrying out in relation to fixed and mobile markets, as well as across the internet more generally.

2.38   It is part of Ofcom's work on digital markets. Recently, we published our approach to competition and consumer issues in internet-based communications markets which sets out our role in regulating these markets and our future work programme.[26]

2.39   This review also complements the CMA's work to promote greater competition and innovation in digital markets.[27] The CMA has published a final report in connection with its market study into Apple's and Google's mobile ecosystems, which looked at whether the two firms' effective duopoly is stifling competition (and thus reducing innovation and increasing prices for consumers) across a range of digital markets.[28]

2.40   Our approach to net neutrality is an important factor in the mobile sector. Our ongoing mobile strategy review takes a high-level view of the UK's mobile market to consider how mobile networks might evolve to meet future demand for mobile data and what our future approach should be. We plan to set out our conclusions later this year. Alongside our mobile strategy, we are engaging with the Government as it develops its Wireless Infrastructure Strategy.[29] Our review recognises the importance of clarity around our approach to net neutrality in allowing ISPs the opportunity to realise the potential for innovation offered by 5G.

2.41   Our review also complements our 2021 Wholesale Fixed Telecoms Market Review (WFTMR) Statement, in which we published decisions on regulating fixed telecoms markets that underpin broadband, mobile and business connections. These decisions were

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[26] Ofcom, 2022. *Digital markets in the communications sector*. As part of this work, earlier this month we launched a market study into UK cloud services.
[27] CMA, 2022. *CMA's Digital Markets Unit: exciting opportunities to influence the regulation of big tech.* [accessed 6 October 2022].
[28] CMA, 2022. *Mobile ecosystems market study final report*.
[29] DCMS, 2021. *Wireless Infrastructure Strategy*.

designed to promote competition and investment in gigabit-capable networks – bringing faster, better broadband to people across the UK.[30]

2.42   In 2021, we undertook in-depth research into the emerging technologies that could affect the consumers of tomorrow. We asked some of the world's leading technologies and social scientists what these technologies could be, publishing key findings for the Internet in July 2021.[31] This has informed our consideration of future demands on networks.

2.43   Other work in Ofcom involves engaging with our stakeholders on the topic of sustainability and understanding the role of communication services in enabling the reduction of carbon emissions in other sectors.[32] Ofcom does not have any specific obligations or duties in relation to sustainability and the environment but we understand that for many companies, it is likely to be one of several contextual drivers of decision-making. While this review focuses on the net neutrality rules, there is flexibility outside the scope of these rules for companies to make decisions about how they manage and operate their networks to take account of these wider environmental considerations.

Impact assessment

2.44   The analysis presented in this document constitutes an impact assessment as defined in section 7 of the Act. In the sections that follow, we have set out our analysis for amending aspects of the framework, or our interpretation of it, and have identified the potential benefits and risks of such changes, supporting those which we consider to have the greatest net benefits for consumers.

2.45   Impact assessments provide a valuable way of assessing different options for regulation and showing why the preferred option was chosen. They form part of best practice policymaking. This is reflected in section 7 of the Act, which means that generally we have to carry out impact assessments where our proposals would be likely to have a significant effect on businesses or the general public, or when there is a major change in our activities. However, as a matter of policy, we are committed to carrying out impact assessments in relation to the great majority of our policy decisions.[33]

Equality impact assessment

2.46   We have given careful consideration to whether the proposals in this document will have a particular impact on persons sharing protected characteristics (broadly including race, age, disability, sex, sexual orientation, gender reassignment, pregnancy and maternity, marriage and civil partnership and religion or belief in the UK and also dependents and political opinion in Northern Ireland), and in particular whether they may discriminate against such

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[30] Ofcom, 2021. *Statement: Promoting investment and competition in fibre networks – WFTMR 2021-26*. Subsequent references are to this publication.

[31] Ofcom, 2021. *Internet Futures: Spotlight on the technologies which may shape the Internet of the future.* Subsequent references are to this publication.

[32] See *Ofcom's Plan of Work 2022/23*, p.30 and p.53. Subsequent references are to this publication.

[33] For further information about our approach to impact assessments, see the guidelines, *Better Policy Making – Ofcom's approach to Impact Assessment*, available here.

persons or impact on equality of opportunity or good relations. This assessment helps us comply with our duties under the Equality Act 2010 and the Northern Ireland Act 1998.[34]

2.47   We consider that some of our proposals would have a positive impact on certain groups of consumers. For example, we are proposing to remove barriers in the current net neutrality framework to prioritising and continuously zero-rating emergency communications traffic, including emergency video relay traffic. The latter in particular would help promote equivalent access to emergency communications for disabled people.

2.48   At this stage, we do not envisage that our proposals would have a detrimental impact on any particular group of people.

Structure of this document

2.49   The rest of this document is set out as follows:

- Section 3 sets out the current market context;
- Section 4 sets out our approach for assessing the effectiveness of the net neutrality framework;
- Section 5 discusses our proposed approach to zero-rating;
- Section 6 sets out our proposed approach to managing the impact of traffic demands on ISP networks;
- Section 7 sets out our current position on ISPs charging CAPs for carrying or prioritising traffic;
- Section 8 details our proposed approach on specialised services;
- Section 9 sets out our proposed approach on certain matters relating to the scope of the rules, terminal equipment and public interest exemptions; and
- Section 10 summarises our proposals on guidance and areas where we are seeking stakeholder views on our analysis.

2.50   The Annexes are set out as follows:[35]

- Annex 1: Responding to this consultation;
- Annex 2: Ofcom's consultation principles;
- Annex 3: Consultation coversheet;
- Annex 4: Consultation questions;
- Annex 5: Draft Guidance on Ofcom's approach to assessing compliance with the net neutrality rules;
- Annex 6: Annual report for monitoring compliance with the Open Internet Regulation;
- Annex 7: International case studies;
- Annex 8: Data traffic and costs;
- Annex 9: Consumer outcomes; and
- Annex 10: Glossary and abbreviations.

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[34] Further detail is set out in section 149 of the Equality Act 2010 and section 75 of the Northern Ireland Act 1998.
[35] Annexes 5 to 10 are available on the Ofcom website.
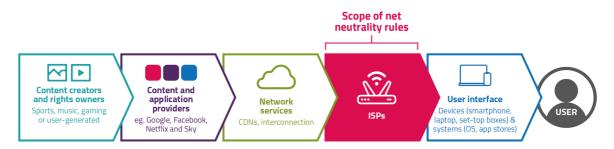
3. Market context

Introduction

3.1   In this section, we provide context that informs our discussion and proposals in the following sections of this document.

3.2   While ISPs continue to have a key role in connecting consumers to the internet, which provides the potential for them to act as gatekeepers of what consumers can access, the internet value chain is complex and has changed significantly since the net neutrality rules were introduced. Large content providers with strong market positions drive the majority of traffic, alongside a long tail of smaller content providers. There are also other providers in the value chain that control the gateways through which consumers access the internet and who therefore have considerable scope to influence consumer outcomes.

3.3   Traffic volumes have been growing for the past few years and we expect this trend to continue. ISPs have been investing in their networks to carry this traffic, including to provide sufficient capacity to carry very large peaks in traffic due to, for example, popular sports being shown live on the internet. CAPs have also been investing in different delivery models that seek to reduce the impact of their traffic on networks.

3.4   Growing traffic demands have been met across the internet so that consumers have continued to be able to access the content they want, when they want it. Their experiences are generally positive including on pricing, although prices have begun to increase recently, and may continue to increase as a result of wider cost of living increases.

3.5   We expect the internet to continue to develop in the future. New technologies and new applications will drive demand for greater capacity, higher download and upload speeds, more stringent quality in terms of latency and other performance metrics, and a wider range of demands from consumers. ISPs and CAPs will need to continue to evolve their networks and their services in order to meet these demands.

3.6   In the rest of this section we set out an overview of the internet value chain and summarise consumer outcomes and traffic trends.[36] Finally, we look at some of the trends that will drive internet development in future.

Overview of the internet value chain

3.7   The internet value chain is highly complex, and online content is delivered from its creators to end users through several stages involving different types of providers.

3.8   In Figure 3.1 below, we show a simplified summary of the value chain.

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[36] Annex 8 of this document sets out some of our findings about data traffic trends in more detail. Annex 9 sets out more detail on consumer outcomes.

Figure 3.1: Simplified value chain

Source: Ofcom diagram

3.9   As set out in Section 2, the net neutrality rules limit the actions ISPs can take, but do not restrict other parties in the value chain. Since the rules were put in place, players with strong market positions have developed throughout the internet value chain and are not constrained in the same way as ISPs.

3.10   We set out the roles each participant plays in the value chain below.

Introduction to key parts of the internet value chain

3.11   In general, traffic on the internet is initiated by a request from the user, which is routed via their ISP across the relevant interconnections to the CAP that hosts the content. Users can be either residential consumers or businesses. The content is then delivered to them.[37] Traffic flows are very often asymmetric, with the request using a small amount of data and the content delivered being much larger.[38]

3.12   Consumers purchase internet access services from fixed and mobile ISPs to access the internet. They also purchase devices with which to access the internet and may buy apps via app stores, often linked to the devices they buy, which are therefore important gateways to internet content. They may also pay CAPs directly for their services, for example via monthly or annual subscriptions.

Content and Application Providers (CAPs)

3.13   A CAP produces content and applications, which it distributes to consumers using the internet. These include video on demand (VOD), social media, gaming, messaging, search, ecommerce and payments, news and government services. CAPs serve a very wide range of segments and can operate different business models.

3.14   The leading CAPs accessed by UK consumers include the largest global technology firms (sometimes referred to as 'Big Tech').[39] Some of these companies have particularly high

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[37] Sometimes after the CAP has checked permissions, such as the user having the appropriate subscription.
[38] Some content may be pushed to consumers without an explicit request, such as software updates.
[39] Big Tech firms typically refer to the largest global technological companies such as Alphabet (Google), Apple, Meta, Amazon and Microsoft.

reach such as Meta,[40] and Alphabet,[41] that are used by almost all online adults, with Amazon and Microsoft coming third and fourth respectively.[42] When looking at the time spent on platforms, our 2022 *Online Nations* report showed that UK adult internet users spent an average of 42 minutes a day on Meta-owned sites and apps and 35 minutes on Alphabet-owned sites and apps.[43] [44] When measured by traffic throughput in the busy hour, a small number of CAPs drive a large portion of internet traffic in the UK. The top five include three of the Big Tech companies (Amazon, Facebook, Google), as well as Netflix and Sky.[45]

3.15   Many of these large CAPs have strong market positions across various segments of the internet. For example, the CMA market study into online platforms and digital advertising found that Google has strong positions in general search and search advertising, while Meta (Facebook) has strong positions in social media and display advertising.[46] In another market study, the CMA found that Google and Apple form a duopoly in the provision of mobile ecosystems (including operating systems, app stores and web browsers).[47] Similarly, a recent study by BEREC notes that the Big Tech firms are the main actors not only as CAPs but also in various parts of the internet ecosystem globally.[48]

3.16   There are other CAPs in the UK, such as the BBC and other public service broadcasters (PSBs), that hold an important role in domestic culture, and may have different financing models to those of the Big Tech companies.[49] There is also a long tail of smaller providers that provide a range of services.

Network services[50]

3.17   In order for ISPs to provide internet access, and for CAPs to deliver their content to consumers, networks need to be connected. CAPs and ISPs may interconnect directly to each other, or there may be other providers – internet backbone ISPs – that are used to deliver the traffic.

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[40] Primarily Instagram, WhatsApp and Facebook.

[41] Primarily Google Search and YouTube.

[42] The BBC and Reach PLC , including all of their subsidiaries, are the joint highest ranking domestic organisations by reach (both 77%). See Ofcom, *2022 Online Nations*, p.17.

[43] Ofcom, *2022 Online Nations*, p.18.

[44] We note that the average daily time spent on a platform is not necessarily indicative of the likely volume of traffic that is generated on ISPs' networks. For instance, some of this time could be spent on low traffic generating activities (e.g. browsing the BBC website).

[45] We note that the majority of Sky's pay TV base is delivered over satellite, although its IPTV service Sky Glass is growing and it does have other over-the-top applications and services (e.g. NOW, Sky Go and other mobile applications).

[46] CMA, 2020. *Online platforms and digital advertising Market study final report*.

[47] CMA, 2022. *Mobile ecosystems Market study final report*.

[48] BEREC, 2022. *Draft BEREC Report on the Internet Ecosystem*, Section 5 (*Main actors of the internet ecosystem*).

[49] CAPs generate revenues through a range of business models. These may include charging consumers for access to their content (e.g. Netflix, Disney), online advertising, or a combination of the two. We note that there are also other funding models, for example, the BBC licence fee.

[50] There are a number of different network services including, web hosting, domain registration, email hosting, DNS hosting and various other security-based services, that are not included in this section.

Content distribution networks (CDNs)

3.18   Content may be more efficiently delivered by hosting content on servers (or caches) close to consumers, so that less of the shared public internet is used to deliver the content. This can lead to better quality of experience as the traffic may be less likely to encounter congestion, increased delay (or latency), data loss and data corruption. CAPs can do this by installing their own caches close to customers, or by using the services of content delivery networks (CDNs).

3.19   To achieve this, caches may be located either in the ISPs' own datacentres, if a commercial agreement can be reached with the ISP, or in a datacentre where ISPs have a presence. This allows data to be served from a CDN cache located within the ISP's network, or from a cache directly connected to the ISP's network.

3.20   CAPs may provide their own caches or may purchase a hosting service from a third party CDN such as Akamai, AWS, and Limelight. Only the largest CAPs tend to provide their own caches because of the costs involved in developing them and deploying them in multiple locations. An example is Netflix, which provides its own caches to ISPs where the ISP's customers generate sufficient traffic to make deploying a cache efficient.[51] The benefit to a CAP of deploying its own caches is that they afford it greater control of how content is stored and delivered and can be tailored to the CAP's business model.[52]

3.21   Third party CDNs host content from multiple CAPs. Where CAPs use third party CDNs, this saves them the capital expense of caches, and instead they pay fees, generally related to the amount of traffic their services generate. This can be more efficient for CAPs that do not generate sufficient traffic to justify their own caches. It can also be efficient for ISPs where this leads to less equipment being deployed overall.[53] Third party CDNs usually offer contracts that give the CAP specific quality of service guarantees and access to the latest codecs,[54] encryption, and adaptive bitrate (ABR) technologies,[55] as well as other services (e.g. security-related services).

Interconnection

3.22   Interconnection between networks allows consumers to access content hosted on other networks and CAPs to distribute their content.

3.23   ISPs and CAPs typically use an IP transit service provided by a major ISP (commonly known as a backbone ISP) for general connectivity to the very large number of networks which form the internet. IP transit provides indirect access to other networks (i.e. traffic is routed

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[51] Netflix, *Open Connect* [accessed 13 October 2022].
[52] Netflix can design caches that are able to host its entire content library, while providers of services with user generated content such as Facebook and Google (in particular YouTube) can deploy algorithms to identify the popular content to cache, which could be different in different caches serving different geographies.
[53] If different CAPs all deployed their own caches, they would each have equipment in the ISP site which may only be used heavily for a short period of the day. Where they have different busy hours, if they use a shared CDN then there could be less equipment needed as different CAPs' traffic would be delivered at different times.
[54] Codec technology is used to encode a signal, and can be used to compress the data, which reduces the transmission bandwidth or storage space.
[55] ABR is a method to improve the quality of video streaming. It adjusts the quality of the stream to better suit the user's bandwidth and device capacity.

via the backbone ISP's network and other networks). IP transit services typically have a capacity- or traffic-based charge.

3.24   Where there is a significant volume of traffic between two networks, traffic may be exchanged directly (i.e. not via an intermediate backbone network), an arrangement known as peering.[56] Typically, the exchange of traffic via peering is settlement free because it is regarded as mutually beneficial by both parties.

3.25   As explained in Annex 8, for the major ISPs, just over 50% of traffic is delivered via caches deployed in ISPs' datacentres (sometimes referred to as on-net caches) and just under 40% via private peering. Private peering traffic is likely to mostly be made up of traffic delivered via caches in datacentres. Of the remaining traffic, approximately 4% is delivered via public peering and 7% via IP transit.[57]

Costs of delivering traffic

3.26   The costs of delivering traffic to consumers depend on how the traffic is delivered (e.g. via IP transit, via peering, via a third party CDN, or via their own caches). Where traffic is delivered via IP transit, transit providers charge fees related to the amount of traffic sent. Where third party CDNs are used, CAPs pay for the amount of traffic that is delivered, and may pay more for higher quality of service guarantees.

3.27   CDNs and CAPs that deploy their own caches face the cost of development, equipment costs, deployment costs and, potentially, datacentre costs (which cover the cost of space and power in datacentres). They need agreements with datacentre providers and the ISPs in whose networks they deploy their equipment. Some of these CDNs and CAPs also build their own networks to distribute content to their caches. They may buy this capacity on wholesale terms from other network providers, or may deploy their own networks.

3.28   Each of these agreements between CAPs, CDNs, datacentres, ISPs and transit providers is negotiated commercially so different parties may incur higher or lower costs to deliver traffic.
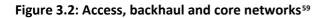
Internet service providers (ISPs)

3.29   An ISP provides connectivity services and access to the internet for both residential and business consumers.

3.30   A service can be provided via a fixed connection into a consumer's home or workplace or to a mobile device. It can be provided through various technologies including copper, coaxial cable, fibre or wireless technologies.[58]

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[56] Peering may be by direct connection between networks (known as private peering), or at an internet exchange point (known as public peering).
[57] Different ISPs will have a different distribution of traffic across different delivery methods. Smaller ISPs are likely to rely more on IP transit with less deployment of on-net caches.
[58] Such as mobile broadband, satellite or fixed wireless access.

Figure 3.2: Access, backhaul and core networks[59]

Source: Ofcom diagram

3.31   As shown in the figure above, ISP networks tend to have an architecture which consists of access, backhaul and core networks. The access network is the "last mile" connection, which connects end users to their ISPs network infrastructure.[60] Backhaul, which is sometimes referred to as "aggregation", is the network that connects an ISP's access network to its core network. The core network comprises high-capacity links used to move traffic over large geographic distances.[61]

3.32   In relation to fixed broadband services, most residential consumers purchase their service from BT (34%), Sky (23%), Virgin Media O2 (VMO2) (20%) or TalkTalk (10%).[62] In addition, there is a wide range of other providers with smaller customer bases, and the vast majority of residential and business consumers have a choice of provider.

3.33   Fixed broadband providers may deploy their own network to supply retail services, or may purchase wholesale services from a different network provider. They may purchase part of their network from other providers and build other parts themselves. For example, many ISPs buy access, but build their own backhaul and core networks. In terms of access networks, Openreach operates the largest network in the UK.[63] VMO2 owns and operates the next largest physical network. There are other providers that are building networks such as CityFibre, and smaller local and regional providers emerging.[64] [65]

3.34   For mobile connectivity services, there are four national mobile network operators (MNOs) in the UK – EE, Vodafone, VMO2, and Three Mobile which use their mobile networks to provide their own retail services. The four MNOs, including their wholly-owned sub brands, together account for around 80% of the UK market by retail subscribers.[66] [✕]. In addition,

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[59] In this diagram we show a single backhaul and core network, but providers that operate both fixed and mobile networks may maintain separate networks for these.

[60] This is the case for both fixed and mobile access. In relation to fixed access, in general, the local access network runs from the customer to the local exchange/point of presence.

[61] In general, there are more access sites than backhaul sites and more backhaul sites than core sites.

[62] Ofcom, 2022. *Communications Market Report 2022 – Interactive data.*

[63] Openreach is a legally separate entity owned by BT. The Openreach network can serve virtually all premises in the UK excluding the Hull Area, where KCOM owns and operates the largest network.

[64] For example, Jurassic Fibre or B4RN.

[65] Ofcom, 2021. *WFTMR 2021-26*.

[66] Based on operator data.

there are a large number of non-MNO owned mobile virtual network operators (MVNOs)[67], such as Sky and Tesco Mobile which together roughly account for the remaining 20%. These MVNOs provide services by purchasing wholesale network access from the four UK MNOs.

User interface

3.35   The user interface determines how a consumer interacts with the internet.

3.36   As the internet has developed, the gateways (i.e. the devices and user interfaces) that people use to access the internet have also expanded, from personal computers (PCs) and laptops to other devices such as smart phones, tablets and connected TVs. These devices have different operating systems, such as Windows on PCs, and Google's Android and Apple's iOS on mobile devices. The internet may be accessed through a web browser supplied by the operating system provider (such as Microsoft Edge, Chrome or Safari), or by a different provider (such as Mozilla Firefox). Increasingly, content is accessed via applications downloaded from an app store, principally those of Google (for Android) and Apple. Accessing the internet through other types of gateways, such as connected TVs and smart speakers is also increasingly popular.

3.37   The providers of these gateways, particularly those that supply devices and operating systems such as Apple and Google, have developed strong positions in determining how consumers access the internet, and a consumer's choice of device and software may impact the ways they access internet content.

Consumer outcomes

3.38   Residential and business consumers are heavily reliant on the internet and this reliance is unlikely to reduce over time. New networks such as full fibre and 5G are rolling out, giving consumers greater access to faster download and upload speeds, which supports the increasing demands of new services being deployed by CAPs (such as ultra-high definition (UHD) TV and virtual reality). As set out in Annex 9, based on research we carried out for this review, both residential and business consumers are currently largely satisfied with their mobile and fixed services.

3.39   Our pricing reports indicate that up until around 2020/2021, consumers were getting a good outcome, with prices for fixed broadband and mobile data stable or falling in real terms while speeds and usage increased. More recently, average prices have begun to increase in 2022. This trend has been driven by some of the major mobile and fixed providers implementing inflation-plus mid-contract price rises against the background of the high inflationary environment in the UK. While there remain a range of offers available at different price points, as highlighted in our latest report on the affordability of services,

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[67] An MVNO is a mobile provider that does not own the wireless network infrastructure over which it provides mobile services to its customers.

we are concerned that the number of consumers struggling to afford their communications services is increasing.[68]
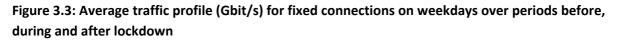
Recent trends in traffic in the UK

3.40   Different types of content and services generate different volumes of traffic and place different requirements on networks. Some services place little burden on networks, such as email or blogs. Some other services, such as video streaming, require more capacity, and some such as gaming are delay-sensitive. Livestreaming of content may require both high capacity and low delay. Popular services, such as Netflix, English Premier League football, or certain gaming titles can drive significant volumes of traffic across networks. But, as set out above, CAPs can use techniques that reduce the potential impact of their traffic on ISP networks while maintaining a good user experience.

3.41   Traffic growth is important because network investment is driven by the amount of traffic that needs to be carried. On fixed networks, the backhaul and core networks costs tend to be the most sensitive to traffic and capacity improvements tend to be more incremental and frequent. In the access network costs are less driven by traffic volumes, and capacity upgrades for a premises tend to be related to technology upgrades which are more significant but less frequent.[69] In mobile networks, access, backhaul and core network costs are sensitive to traffic. Networks need to be built to be able to carry the amount of traffic when networks are busiest, known as the busy hour traffic. ISPs, in dimensioning their networks, plan not only for the level of traffic they generally expect in the busy hour but also how to manage traffic if their networks get exceptionally busy. In building networks to carry exceptional peak traffic, networks will be much less utilised for the rest of the time.

3.42   Overall traffic in the UK continues to grow. The average year-on-year traffic growth over the period 2013 to 2021 was 42% for the average fixed broadband consumer, while average growth was 37% for the average mobile data consumer. ISPs expect traffic volumes to grow further in future and while future demand projections are inherently uncertain, we do not currently have evidence to suggest that growth rates will increase in the period up to 2030 compared to those over the last decade.[70]

3.43   Traffic demand tends to peak daily in the evening (around 8pm) when residential consumers have more time to use popular services. The traffic in this busy hour has also grown. Figure 3.3, reproduced from the 2021 *Connected Nations* report, shows a typical demand profile for a fixed ISP across a day, which tends to peak at around 8pm in the evening.[71] In reporting this data in *Connected Nations*, we focused on the effects of the lockdowns due to the Covid-19 pandemic. The line shown from 27 January to 23 March

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[68]Ofcom, *Pricing trends for communications services* reports and *Affordability of communications services* report (2022).
[69] As explained in Annex 8, fixed access network costs are less sensitive to traffic volumes and are driven more by the coverage provided (in terms of the number of customers that can be served) and the technology used.
[70] We note that this aligns with the medium growth scenario in our Discussion paper: Meeting future demand for mobile data, which assumed a growth rate on mobile networks of approximately 40%. Subsequent references to this discussion paper are to this document.
[71] Ofcom, 2021. *Connected Nations 2021.*

2020 represents the average traffic profile prior to lockdown, with the two other periods representing different lockdown periods. These show that the peak traffic continued to be in the evening during lockdown, but that there was significant growth in traffic during the off-peak time during the day due to people working from home more, home schooling, etc.

Figure 3.3: Average traffic profile (Gbit/s) for fixed connections on weekdays over periods before, during and after lockdown

Source: Connected Nations[72]

3.44   The growth of traffic on the networks of fixed ISPs in the busy hour is shown in Figure 3.4 below. Busy hour traffic grew by an average of 40% from 2019 to 2020 and 15% from 2020 to 2021 for the three fixed ISPs networks which were able to provide us with sufficient data. Traffic is generally highest in December, so that the busiest periods on the network are evenings in December.

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[72] Ofcom, 2021. *Connected Nations 2021*, Figure 15. The chart shows a typical ISP's traffic distribution. Most ISPs have a similar profile overall, though the scale of the traffic and the exact timings of peaks, etc., will vary. The y-axis starts at zero and shows that traffic is at a minimum at around 6am and peaks around 8pm.
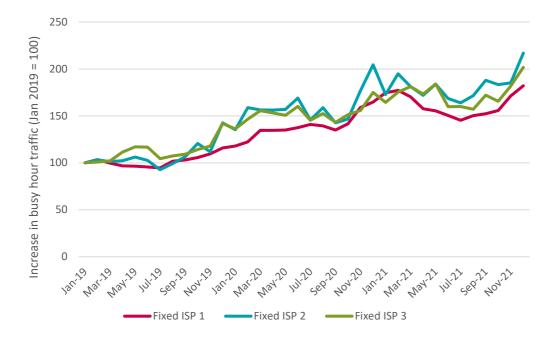
Figure 3.4: Average traffic in the busy hour for selected fixed ISPs by month[73]

Source: Ofcom analysis based on RFI data[74]

3.45   A large portion of the busy hour[75] traffic (in the region of 50%) on fixed networks is driven by five large CAPs, specifically Amazon, Facebook, Google, Netflix and Sky.[76]

3.46   Sometimes, networks experience traffic peaks where the traffic is significantly higher than the usual busy hour traffic. These exceptional traffic peaks could be the result of a single event or of multiple events occurring simultaneously – in the last three years they have largely been driven by the livestreaming of popular sports, especially football. Downloads of popular games also contributed to some of these peaks, although to a lesser extent than live sports.[77] While the magnitude of these peaks has grown in recent years, this has not been at a higher rate than traffic generally, so traffic does not appear to be becoming peakier.

3.47   ISPs have built their networks to take account of these peaks, which has enabled them to manage the peaks with very limited impact on the quality of their services, although in some cases they have needed to rely on capacity built to provide resilience (this is discussed further in Section 6). They continue to invest in their networks; investment in the

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[73] Information available from the mobile ISPs on busy hour data traffic was not sufficient to be able to publish a similar graph as shown above.

[74] Note that the definition of the busy hour varies across different ISPs. [✂],[✂] and [✂].

[75] The busy hour was defined as "the busiest 60 minute period of the day on average during the month". We sought this information for ISPs backhaul, core and IP interconnect domains.

[76] We note there were limitations to the data received. A number of the [✂]. Two CDNs, Akamai and Limelight, also contribute a material proportion of traffic throughput in the busy hour.

[77] We gathered information on the top ten peaks on each ISP's network in each of the last three years to assess the drivers of exceptional peaks.

last five years has been fairly consistent and generally they expect to invest at similar levels in the next few years.

3.48   In addition, CAPs are taking action to help deliver traffic more efficiently. They have invested in their own or third party CDNs, and in some cases they have invested in other network infrastructure (such as international subsea cables) and in developing and deploying codec and ABR technology which reduces the amount of data needed to deliver content of a particular quality. In some cases, they also have sought to co-ordinate and explain their content distribution plans with the ISPs.

3.49   For a more detailed discussion of underlying traffic trends, please see Section 6 and Annex 8.

Future market trends

3.50   We have considered how the internet might evolve, what services may arise, and how this might impact on networks in the future. We have drawn on our *Internet Futures* report, and our 2022 discussion paper on *Meeting future demand for mobile data*.[78]

3.51   CAPs are offering novel and innovative services. For instance, there has been growth in new delay- and congestion-sensitive applications, with services delivered over the general internet that provide a mixture of both VOD and live content. These video services are likely to continue to increase in quality.[79] Gaming and augmented reality/virtual reality experiences are evolving in the home, workplace and on the move, offering new ways to interact with others and the environment.

3.52   Network operators are investing in new technologies which offer the possibility of new and innovative services in both residential and business contexts. These include new 5G mobile services, which offer faster speeds, greater capacity, and lower latency than previous technologies. And the accelerated move of many businesses to the cloud (both edge and core services), also offers a platform for new and important applications and services.[80]

3.53   In the future, the internet could develop in different ways. For example, the metaverse(s) may allow activities that are currently offline to be conducted online, and many currently online activities to be conducted in a way that make it less obvious that they are not being conducted face to face. Consumers may also connect to networks on the move via new wearable devices which help support a new range of services (such as preventative

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[78] See Ofcom, 2021, Internet Futures, and Ofcom, 2022, Discussion paper: Meeting future demand for mobile data.
[79] Streaming ultra-HD video can drive more data than SD or HD and will become more common. However, we note that increases in encoding technology may mean advances in picture quality of video streaming may not require more bandwidth to deliver it.
[80] 'Edge computing' concepts can apply to several scenarios. In the enterprise market, it is a distributed computing framework that brings enterprise applications closer to data sources such as IoT devices or local edge servers. This proximity to data at its source can allow faster insights, improved response times, and better bandwidth availability. In the telecommunications market, it refers to the distribution of software-based network functions and applications or content nearer to subscribers or devices.

healthcare applications).[81] Other developments include holograms, multi-sensory communications that create the sense of touch and smell, and brain-to-machine communications that may support commands initiated directly via brain activity.

3.54   Although it is not possible to be precise about the new and innovative services that will emerge for consumers and businesses, many of these developments, both short term and longer term, point to the need for more network capacity, greater download and upload speeds, and potentially more stringent requirements for guaranteed throughput and lower latency, while needing to cope with an ever-increasing range of demands from consumers.

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[81] Wearable devices may connect via Bluetooth to a phone which provides connectivity to the network and drive increased use on this connection rather than connecting directly to the network.

4. Approach for assessing the effectiveness of the net neutrality framework

4.1   This section sets out our overall approach for assessing the effectiveness of the net neutrality framework:

- We first set out our overarching policy objectives and the positive market outcomes we want the net neutrality framework to achieve.
- We explain the general market concerns that the net neutrality framework seeks to address in order to achieve our objectives.
- We then identify potential concerns that may arise or have arisen from the application of the current net neutrality framework.
- Finally, we outline how we have carried out our assessment of specific aspects of the net neutrality framework in Sections 5 to 9 of this document.

Policy objectives relevant to the review

4.2   Our review of the net neutrality framework is structured around three overarching policy objectives and the positive market outcomes we want them to achieve.

a) **Safeguarding citizens' and consumers' access to an open internet**, so that:

i)   consumers are able to access and distribute online content, applications and services of an appropriate quality and at reasonable prices and use the terminal equipment of their choice via an appropriate internet access service;

ii)   citizens are able to access and distribute the widest range of lawful information online, are unconstrained in how they can express their opinions and participate in the public debate and other democratic processes, and can access a wide range of public services; and

iii)   CAPs are able to distribute and provide online content, applications and services to all consumers and citizens.

b) **Safeguarding the open internet as an engine of innovation** so that citizens and consumers benefit from competition through:

i)   CAPs having strong incentives to continuously innovate; and

ii)   consumers having a choice of a wide range of online content, applications and services in the long run.

c) **Safeguarding well-run, efficient and robust networks,** so that:

i)   providers of connectivity services are able to manage their networks in an efficient manner, ensuring the widest availability of services at the best quality of experience to consumers and citizens, with the lowest cost; and

      ii) providers of connectivity services continue to invest and innovate in their networks and services, to ensure their networks are fit to meet consumers' needs and support innovation in online services, today and in the future.

4.3 The first two objectives reflect the objectives underpinning the net neutrality rules.[82] In addition, we consider the third objective is important for us to fulfil our general duties under the Act to encourage investment and to have regard to the need for the efficient provision of network access and services, as set out in Section 2.[83] These objectives are interlinked and our policy needs to perform an important balancing function, for example, in ensuring that regulation does not inadvertently undermine network efficiency and robustness which would otherwise put at risk the infrastructure that an open internet and innovation depend upon.

4.4 In the remainder of this document, we use these objectives to assess how the current net neutrality framework is working and whether any potential changes to it might be appropriate.

What concerns does the net neutrality framework seek to address?

4.5 In this section, we set out the broader rationale for the current net neutrality framework by reference to the market failures it seeks to address. The intention of this section is not to draw conclusions as to the strength of these concerns, but to provide important context for assessing specific aspects of the net neutrality framework in sections 5 to 9.

ISPs have gatekeeper positions and have the potential to exploit market power over CAPs

4.6 The internet has become an essential part of consumers' and citizens' daily lives.[84] Easy access to online content and services from a wide range of CAPs is crucial to ensure that citizens and consumers can benefit from the open internet fully. Similarly, CAPs need an open platform with low access barriers to be able to provide online services to end-users over the internet.[85]

4.7 It is ISPs, as providers of connectivity services, that connect CAPs with consumers. ISPs compete against each other for consumers to subscribe to their connectivity services. However, once consumers have made their subscription decisions, each ISP has a degree of control over access to their customers, who must use their connectivity services to access services online. Therefore, ISPs can be considered to hold a 'gatekeeper' position over the customers who have subscribed to the ISPs' services.

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[82] Recital 1 of the Regulation: "This Regulation aims to establish common rules to safeguard equal and non-discriminatory treatment of traffic in the provision of internet access services and related end-users' rights. It aims to protect end-users and simultaneously to guarantee the continued functioning of the internet ecosystem as an engine of innovation."
[83] See Section 2, *Ofcom's duties and powers*.
[84] See Section 3, *Consumer outcomes*.
[85] Recital 3 of the Regulation: "The internet has developed over the past decades as an open platform for innovation with low access barriers for end-users, providers of content, applications and services and providers of internet access services."

4.8   ISPs' gatekeeper positions can result in them being able to exercise market power over CAPs.[86] Consumers typically subscribe to a single ISP over a period of time. Every ISP therefore provides a unique route for CAPs to reach an ISP's customers over that period of time and CAPs require access to multiple ISPs to reach end users widely. The larger an ISP's customer base is, the more important the ISP becomes as a conduit for CAPs to reach consumers, and therefore the more likely the ISP is to have a degree of market power over CAPs.[87]

4.9   Consumers typically subscribe to both a fixed ISP and a mobile ISP,[88] and in principle CAPs can reach consumers through either channel. In practice, however, distributing content via every fixed and mobile ISP is likely to be essential for CAPs because fixed and mobile connectivity tend to serve different consumer needs.[89] CAPs do not therefore tend to choose between mobile or fixed ISPs as alternatives, but rather they generally have to deliver the content through whichever channel is initiated by the consumer.[90]

4.10   In the absence of the net neutrality rules, ISPs could in principle exploit market power over CAPs. For example, ISPs could charge CAPs excessive fees for access to their customers, and they could block or throttle access to the online services of CAPs that are unable or unwilling to pay. Moreover, ISPs may have an incentive to discriminate between different CAPs, for example, by favouring their own content or those of third parties who are willing to pay higher fees. Such practices could limit the ability of CAPs (especially smaller CAPs) to reach consumers. The potential for ISPs to exploit such market power therefore risks harming outcomes for consumers and citizens and undermining innovation by CAPs.

4.11   The net neutrality rules seek to address these concerns by imposing 'must-carry' and 'non-discrimination' obligations on ISPs, which is achieved by prohibiting them from blocking, throttling, or applying differential treatment of traffic for commercial reasons (which, in practice, includes preventing ISPs from charging CAPs for such access), as explained in Section 2.[91] In doing so, they limit the ability of ISPs to exploit any market power they may have over CAPs.

4.12   As identified in Section 3, there are some very large CAPs that have emerged in the last decade, and they are able to constrain ISPs to some degree. The most notable examples

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[86] In this document, we refer to market power as an economic concept where a firm does not face effective competitive pressure. Market power can be thought of as the ability to profitably sustain prices above competitive levels or restrict output or quality below competitive levels. A firm with market power might also have the ability and incentive to harm the process of competition in other ways; for example, by weakening existing competition, raising entry barriers or slowing innovation. Market power is not absolute but is a matter of degree. The term 'market power' reflects circumstances where market power is held individually or collectively. Any reference to 'market power' in this document does not imply that a firm has significant market power or dominance in a legal sense.

[87] Some larger CAPs can have countervailing bargaining power over the ISPs, as discussed below.

[88] See Annex 9. According to Ofcom's 2022 Tech Tracker, 87% of households have both fixed and mobile broadband internet access; only 4% of households only use mobile phones.

[89] Fixed is better suited to high volume and quality-sensitive content while mobile is better suited to use on-the-go. As discussed in Annex 9, only 21% of those with both a fixed broadband and mobile internet connection access the internet via their mobile when at home.

[90] For example, when users request certain content via their mobile ISP, the CAP cannot deliver that content via the users' fixed ISP as an alternative.

[91] See Section 2, *Open Internet Access Regulation*.

are the so-called 'Big Tech' firms such as Amazon, Google and Meta, which control some of the largest global internet platforms and provide a significant amount of online content and services to consumers, as well as large video streaming providers such as Netflix and Disney. These large CAPs can potentially use their strong bargaining power to protect themselves from being exploited by ISPs. However, such competitive dynamics between the ISPs and large CAPs would not benefit smaller CAPs, which do not have the same degree of bargaining power as large CAPs. Therefore, we consider that the potential for ISPs to exercise market power remains a valid concern in respect of smaller CAPs whose ability to distribute content and to innovate is an important feature of the open internet. [92]

4.13   In addition, we are aware that there are other gatekeepers alongside the ISPs in the internet ecosystem. [93] For example, some Big Tech firms control access to consumers in certain contexts (e.g. Apple and Google in mobile ecosystems, including operating systems, app stores and browsers) which may allow them to restrict consumers' access to content and charge CAPs for accessing consumers, potentially harming consumer outcomes. The activities of these firms are not covered by the net neutrality rules, but are being considered separately in other work conducted by Ofcom, the CMA and other authorities. [94] However, their presence is relevant to our assessment of the effectiveness of the current net neutrality rules – which focus on the activities of ISPs alone – in ensuring access to an open internet and innovation. Therefore, in this review we consider it is appropriate to have regard to how the internet ecosystem is functioning as a whole.

The net neutrality rules also address other barriers for CAPs

4.14   While a significant proportion of traffic on the internet is driven by a limited number of large CAPs, there is a very long tail of smaller CAPs. [95] All CAPs should be able to access the widest possible market, and any barriers for them doing so could be problematic. This could be especially true for smaller CAPs who have limited scale and less resources.

4.15   Such barriers could exist irrespective of whether ISPs may have market power over CAPs. For example, if CAPs were required to agree with ISPs to deliver online services to their customers through some form of negotiation, contract or registration, this could deter a long tail of CAPs from accessing end-users. In particular, smaller CAPs would be put at a disadvantage relative to larger CAPs, given the practicalities and costs of agreeing with each ISP individually. If market forces were left to their own devices, such barriers could undermine smaller CAPs' ability to distribute their content to consumers and citizens widely.

4.16   The net neutrality rules seek to reduce unnecessary barriers for CAPs to reach end-users by removing the need to enter into agreements with ISPs to deliver traffic. This ensures that all CAPs irrespective of their sizes can innovate to provide online services and reach

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[92] We consider the potential differential impacts of liberalising aspects of the rules on smaller as opposed to larger CAPs in Section 5 below on zero-rating and Section 7 on charging for access to the network.
[93] See Section 3, *Overview of the internet value chain*.
[94] See Section 2, *Links with other work*.
[95] See Section 3, *Overview of the internet value chain*.

consumers without agreements with ISPs. This in turn facilitates citizens' access to the widest range of online content and services of their choice.

The net neutrality rules address information asymmetries that could undermine consumer choice

4.17 Information asymmetry is another reason why competition alone may not deliver good outcomes for citizens and consumers.[96] Without regulation, ISPs may not have an incentive to be transparent to consumers about how they distribute content (e.g. they would not be required to disclose if they favoured certain CAPs or blocked certain content). Even if ISPs were transparent, e.g. by disclosing such information in terms and conditions, consumers may find it difficult or time consuming to understand. As internet services become more sophisticated over time, we expect that ISPs will continue to have a strong information advantage over consumers.

4.18 Opaque and complex information undermines consumer choice. There is a risk that without the right information consumers would not be able to effectively choose an ISP that allows them to access the CAPs that they want to access. This would run counter to the objective of safeguarding an open internet. The net neutrality rules aim to prevent such outcomes by ensuring that CAPs are treated equally and that appropriate information is made available to consumers.[97]

What concerns may arise or have arisen from the application of the current net neutrality framework?

The framework has delivered protections to CAPs to date

4.19 Since the net neutrality framework was introduced in 2016, it has supported consumer and citizen choice of content as well as ensuring CAPs are able to deliver their content to them. In carrying out our duty to monitor compliance, we have not seen any evidence of ISP practices which have resulted in the blocking or throttling of individual CAPs, or of ISPs determining which CAPs should succeed in any given market segment. In line with this, stakeholders' responses to our 2021 Call for Evidence and RFIs broadly confirm that CAPs have been able to deliver online services to citizens and consumers without facing barriers from ISPs. Overall, the net neutrality framework appears to be delivering strong protections for CAPs and consumers and citizens in order to safeguard an open internet and facilitate innovation.

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[96] Consumers may not choose the best course of action if they do not have all the relevant information or technical knowledge they need when choosing products. This could arise because consumers make decisions based on imperfect information, or if there are asymmetries between the information available to consumers and online service providers.
[97] Transparency is one of the key requirements of Open Internet Access Regulation. For example, ISPs contracts should include details of download / upload speeds, traffic management policies and remedies available to consumers if they experience performance issues with their internet access service. See Section 2, *Current Regulatory Framework*.

We want to ensure that the framework reflects industry developments and facilitates innovation and network efficiency to meet our objectives

4.20   The internet ecosystem has evolved significantly in the past decade. As discussed in Section 3, technologies have advanced; consumers are more reliant on the internet; some Big Tech firms play increasingly important roles both as CAPs and as gatekeepers elsewhere along the value chain; and the demand for data traffic and quality of service is expected to grow significantly.

4.21   These developments have led to competing views on the effectiveness of the net neutrality framework. ISPs argue the rules mean they are not able to recover appropriate costs from the CAPs, undermining efficiency and leading to higher prices for consumers, and that they are unable to innovate both in terms of the retail packages they offer to end users and in offering new services to CAPs.

4.22   Conversely, CAPs argue that the rules are necessary to support innovation in content, and that they themselves already invest heavily to deliver traffic more efficiently. They also argue that their services create the value that users derive from internet access and support the business case for upgrading networks, as they drive end users to pay a premium for higher speed services.

4.23   In order to meet our objectives, our review aims to ensure that the net neutrality framework reflects industry developments and continues to protect CAPs and citizens' and consumers' choice of them. In doing so, we also want to ensure that the framework is proportionate and does not impose more restrictions on ISPs than are necessary to protect citizen and consumer choice of online services. We have therefore examined concerns raised by ISPs, specifically on the extent to which the current net neutrality framework allows them to engage in:

- innovation in retail offers to better meet consumer needs;
- innovation in how content is delivered and the services ISPs can offer to CAPs;
- traffic management to ensure efficient operation of and investment in networks; and
- charging CAPs for carrying or prioritising general internet access traffic, in the interests of improving the efficiency of network utilisation.

Innovation in retail offers that better meet consumer needs

4.24   Consumers have diverse needs and budgets. ISPs have suggested, however, that the current rules may constrain their scope to tailor retail offerings according to consumer preferences, including on quality of service parameters. Our review considers the merits and possible adverse impacts of adopting a more flexible approach.

4.25   Based on responses from stakeholders, this issue arises in the following areas:

- Zero-rating, i.e. ISPs offering retail products that do not count certain content usage towards a user's data allowance. We assess this in Section 5.

- Offering retail products with different quality levels, such as on latency, jitter or packet loss. This is relevant to the net neutrality framework on traffic management, which we assess in Section 6.

4.26   We also consider several other aspects of the net neutrality framework, where there are concerns that the net neutrality rules, or uncertainty about the interpretation of the rules, may be inhibiting innovation by preventing ISPs or CAPs from providing services which would benefit consumers. These include the application of the framework in relation to emergency calls, parental controls, measures to address scams, and internet access services provided on transport. We discuss these in Section 9.

Innovation in how content is delivered and the services ISPs can offer to CAPs

4.27   The current net neutrality framework applies to general, publicly-available internet access services. It also provides for other services, commonly known as 'specialised services', that are not subject to the same restrictions as general internet access under the net neutrality rules.[98] Specifically, ISPs can offer services other than internet access which optimise traffic to meet quality requirements for specific types of traffic that cannot be met by general internet access services.

4.28   Recent technological advances in communications have generated greater demand from a broader range of services which might benefit from such optimisation.[99] ISPs told us that this is particularly relevant to 5G, where customising services to the requirements of individual devices and applications is required to make the best use of scarce radio spectrum resources.

4.29   We consider the role of specialised services in Section 8 and the appropriate scope of the net neutrality rules in Section 9. Where appropriate, we assess the extent to which clarifying the guidance may allow ISPs to innovate in how content is delivered and in the types of services which ISPs can offer to CAPs.

Traffic management to ensure efficient operation of and investment in networks

4.30   As explained above, one of our objectives is to ensure that networks are robust and well-run. While competition will continue to be a key driver of network investments, it is also important that we ensure the net neutrality framework does not hinder efficient operation of and investment in networks.

4.31   ISPs and CAPs have expressed different views about the impact of the current net neutrality framework, and particularly the rules on traffic management, on network efficiencies. ISPs are generally concerned that certain large CAPs generate the majority of data traffic and cause 'peaky' traffic, which has driven the need to increase network capacity. ISPs argue that the framework restricts their ability to manage traffic which results in inefficient investment in their networks. Conversely, the CAPs told us that they

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[98] See Section 2, *Current Regulatory Framework*.
[99] See Section 3, *Future market trends*.

take active steps to deliver traffic more efficiently and invest in infrastructure to deliver traffic to ISPs.

4.32 Our assessment of the impact of the current net neutrality framework on ISPs' scope to run their networks in an efficient and robust manner is set out in Section 6. Specifically, we consider the extent to which the framework may limit the flexibility of ISPs to prevent or mitigate congestion. We also set out our position in relation to retail products with different quality levels and how these can support efficiency objectives.

Charging CAPs for carrying or prioritising general internet access traffic

4.33 Section 7 considers the issue of enabling ISPs to charge CAPs for carrying or prioritising general internet access traffic. It discusses the arguments for and against a charging regime in light of the objectives of this review, including the arguments raised by ISPs that a charging regime can improve the efficient operation of their networks and efficiency in investment.

How we carry out the detailed assessment of the net neutrality framework

4.34 Sections 5 to 9 of the document assess specific areas of the net neutrality framework, namely zero-rating, traffic management, ISPs charging CAPs, specialised services, and scope and exceptions. In each section, we consider the arguments and available evidence in detail and, where appropriate, we set out:

- how well the framework has worked in delivering good outcomes and achieving our objectives;
- what aspects of the framework could be clarified to enhance outcomes; and
- our proposed approach, including proposals to clarify guidance on the current net neutrality rules, and the areas where it may be beneficial to provide further flexibility to ISPs, subject to legislative changes.

4.35 Section 10 provides a summary of our proposals on guidance and areas where we are seeking further views on our analysis.

5. Zero-rating

Introduction

5.1 In this section, we review how the net neutrality rules have been applied to the commercial practice of zero-rating by ISPs.[100] We consider the extent to which our existing approach to applying the rules to zero-rating achieves our policy objectives, as set out in Section 4. We then consider if there should be revised guidance for zero-rating offers.

5.2 In summary, we propose to clarify and simplify our guidance on how we will assess zero-rating offers. Our proposed approach generally continues our current approach of assessing zero-rating offers on a case-by-case basis, while revising our guidance to clarify that we are likely to have concerns only in limited circumstances. In particular, we are unlikely to have concerns where ISPs provide:

- zero-rated access to information and services from public sector organisations (e.g., Government, NHS) that provide a public benefit and are not in competition with other suppliers; and
- zero rating offers that are genuinely open for all CAPs of a certain category, or class, of applications ("class-based offers") to join.[101]

Background

Zero-rating and the net neutrality rules

5.3 Under a zero-rating offer, an ISP gives its customers more favourable access to certain content over other types of content by not subtracting usage of zero-rated content from the user's data allowance. If such an offer has a strong influence on consumer behaviour to favour zero-rated CAPs, it may create barriers for other CAPs to compete effectively. In some circumstances, zero-rating practices could potentially reduce consumer choice, undermine the open internet and limit the ability for smaller CAPs to innovate in the long term.

5.4 Historically, the net neutrality rules have been interpreted by national regulatory authorities (NRAs) of EU member states, BEREC and Ofcom as neither prohibiting nor permitting all zero-rating offers, but instead needing NRAs to assess any concerns on a case-by-case basis.[102] While the rules do not explicitly refer to the practice of zero-rating, assessment of these types of offers have previously taken into account:

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[100] Zero-rating tends to be a feature of the mobile markets, where unlimited data packages are not as universal as for fixed broadband. Our analysis in this section has therefore mainly focused on UK mobile providers.

[101] A class is a grouping of similar CAPs, such as video streaming content, audio streaming content or social media.

[102] BEREC, 2020. *BEREC Guidelines on the Implementation of the Open Internet Regulation*. Originally adopted in 2016, the Guidelines were updated in June 2020 to provide additional clarification to stakeholders. These guidelines were further revised in 2022 (see paragraph 5.10 below).

- Articles 3(1) and 3(2), which respectively establish end-users' rights to access and distribute the information of their choosing using the equipment of their choice, while requiring that these rights should not be limited by commercial agreements and practices between ISPs and end-users; and
- Article 3(3), which requires ISPs to treat all traffic equally, subject to certain conditions and exceptions (as set out in Section 2).[103]

5.5   Previous versions of the BEREC Guidelines have set out the types of factors that NRAs should consider when assessing zero-rating offers and we took these into account when creating our own zero-rating framework, detailed below.[104]

Our current approach to zero-rating and guidance

5.6   Since 2016, we have been assessing zero rating offers on a case-by-case basis. In 2019, we published our Framework document outlining our approach to assessing compliance with the net neutrality rules, including a three-step framework for assessing zero-rating offers.[105]

5.7   We have used this framework to date to determine whether there are reasonable grounds to suspect the rules may have been breached:

- **Step 1** considers whether the offer has the potential to limit and/or exclude end-users' access to certain content/applications;
- **Step 2** looks at whether the offer appears to have the ability to influence end-users' exercise of rights; and
- **Step 3** asks whether the offer or commercial practice could potentially materially restrict or adversely affect end-user choice in practice.

5.8   Under Step 3, our Framework document identifies five questions we would consider when assessing whether a zero-rating offer has materially affected user choice:[106]

- the market positions of the relevant ISPs and CAPs;
- the extent to which users may be incentivised to use specific apps/services (based on factors such as their tariff's general-purpose data allowance or the length of the offer);
- the potential scale of the practice (e.g. how many customers the offer is available to) and the presence of alternative zero-rating offers available at the time;
- the likely effect of the offer on other specific apps or services; and

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[103] Article 3(3) effectively prohibits ISPs from continuing to allow normal access to certain zero-rated traffic when access to the rest of the internet is otherwise blocked or slowed down. We discuss this further in paragraphs 5.72 to 5.84.

[104] These factors were originally identified in the now superseded 2016 BEREC Guidelines (p.46), before being reiterated in the amended 2020 BEREC Guidelines (pp.13-14 and accompanying Annex). However, they are no longer reflected in the current 2022 BEREC Guidelines given the amendments that occurred in light of the 2021 CJEU judgment (see paragraph 5.10).

[105] Ofcom, 2019. *Ofcom's approach to assessing compliance with net neutrality rules*, Section 3. Although published in 2019, the framework had been developed by Ofcom since we began our enforcement of the Regulation in 2016. Subsequent references in this chapter are to this publication.

[106] The Framework document, paragraph 3.16. We noted that these five questions are not exhaustive and that we may consider a wide range of factors when assessing whether end-users' choice may be materially affected.

- the extent to which the offer seeks to circumvent the goals of the net neutrality rules.

5.9   In the document, we encouraged ISPs to use this framework to assess any zero-rating offers they were considering bringing to market.

European Court rulings and 2022 BEREC Guidance

5.10   In September 2021, the Court of Justice of the European Union (CJEU) issued three rulings that found certain zero-rating offers to be in breach of the requirement of equal treatment in Article 3(3) of the net neutrality rules.[107] BEREC subsequently revised its Guidelines in June 2022 to reflect these rulings and explain that zero-rating of specific CAPs or categories of traffic is not permitted in the EU (although zero-rating of *all* internet traffic at certain times would likely be compatible with the rules).[108] We discuss these CJEU rulings and the BEREC Guidelines further in paragraphs 5.41 to 5.43 below.

Commercial context

Take-up and availability of zero-rated access to commercial CAPs

5.11   In the UK, there are currently relatively few zero-rating offers relating to commercial content. Information we have obtained from the largest UK mobile providers indicates that at the beginning of 2022, 19% of customers had a mobile contract that provided zero-rated access to certain commercial content.[109] In recent years, some major mobile providers have withdrawn such offers. For example, O2 no longer offers its "unlimited music streaming" service,[110] Three has withdrawn its Go Binge product for new customers,[111] while Vodafone has also withdrawn[112] its zero-rated 'Vodafone Pass' and now only offers zero-rated access to video content under its VOXI brand.

Data allowance and data usage in the UK

5.12   This reduction in offers with zero-rated access to commercial content has taken place in the context of an increasing popularity of tariffs with greater or unlimited data allowances.

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[107] Cases C 34/20 – *Telekom Deutschland v Germany*, C-854/19 – *Vodafone v Germany* and C-5/20 – *Bundersverband v Vodafone*. See CJEU press release here, September 2021.
[108] BEREC, 2022. *BEREC Guidelines on the Implementation of the Open Internet Regulation*. In addition to clarifying what types of zero-rated tariffs are likely to be admissible or not, the Guidelines now no longer include the criteria previously required for NRAs to assess these tariffs on a case-by-case basis.
[109] This is 19% of their customers who have any type of mobile contract (including those with unlimited data or no data) that provide access to commercial content, which is mostly social media, video streaming or audio streaming content. This 19% does not include consumers who have purchased a temporary 'add-on', which provides them with zero-rated access for a given month. Some of these customers are on legacy contracts, meaning even mobile providers that have withdrawn contracts with zero-rated access for new customers, have continued to provide zero-rated access to content for ongoing contracts.
[110] See Framework Document, paragraphs 3.27 to 3.28. While the offer was not strictly zero-rating, it was advertised as unlimited streaming.
[111] Three website, *All about Go Binge* [accessed 13 October 2022].
[112] Vodafone website, *What are Vodafone Passes?* [accessed 6 October 2022].

The number of mobile customers with unlimited data (who would have no need for zero-rated offers) has increased from 5% in January 2019 to 17% in January 2022.[113]

5.13   Data allowances in general also appear to be increasing. More than half of UK consumers now have a data allowance of more than 10GB, with the proportion of consumers with more than 10GB (or unlimited) data per month increasing from 32% in 2019 to 53% in 2022.[114] Furthermore, most customers do not appear to come close to exhausting their data allowance, as in 2022 more than 80% of consumers (excluding those with unlimited data) used less than half their monthly data allowance, while only 8% use more than 90% of their monthly data allowance.[115]

Widespread zero-rated access to non-commercial services

5.14   In contrast to the limited take-up and availability of tariffs with zero-rated access to commercial services, zero rating offers of non-commercial services have become more prevalent in recent years. For example, since mid-2020 all major mobile providers offer zero-rated access to websites supporting victims of crime, as part of a UK Government coordinated initiative.[116] During the Covid-19 pandemic, the major mobile providers also provided zero-rated access to the educational website Oak National Academy,[117] as well as other non-commercial websites.[118]

Ofcom enforcement and monitoring to date

5.15   Since 2016, we have sought to pro-actively monitor and review the zero-rating offers which have been introduced to the UK market. We have carried out initial assessments of a number of offers and, at the time, none of these raised sufficient concerns to warrant opening a formal investigation into the zero-rating element of the offers.[119] All our initial

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[113] Ofcom analysis based on: BT Group response to the RFI dated 17 March 2022; Three response to the RFI dated 17 March 2022; Sky Response to the RFI dated 17 March 2022; VMO2 response to the RFI dated 17 March 2022 and Vodafone Response to the RFI dated 17 March 2022.

[114] These figures exclude those who only have a 10GB monthly allowance. Ofcom analysis based on: BT Group response to the RFI dated 17 March 2022; Three response to the RFI dated 17 March 2022; Sky Response to the RFI dated 17 March 2022; VMO2 response to the RFI dated 17 March 2022 and Vodafone Response to the RFI dated 17 March 2022.

[115] Ofcom analysis based on: BT Group response to the RFI dated 17 March 2022; Three response to the RFI dated 17 March 2022; Sky Response to the RFI dated 17 March 2022; VMO2 response to the RFI dated 17 March 2022 and Vodafone Response to the RFI dated 17 March 2022. Even most customers with small monthly data allowances did not use the majority of their data. For example, even for customers with a monthly data allowance of 500MB or less (including those with no inclusive data allowance), over 80% of these customers used less than half of their monthly data allowance.

[116] UK Government website, 2020. *Data charges removed for websites supporting victims of crime* [accessed 13 October 2022].

[117] Mobile UK, 2021. *Mobile Operators Extend Educational Assistance by Zero-Rating Oak National Academy Website*. [accessed 13 October 2022].

[118] For example, O2 provided zero-rated access to various websites aimed at bereavement support; mental health support and financial support: *O2 announces zero rating for support websites during COVID-19*. [accessed 13 October 2022].

[119] As explained in our Draft Regulatory Enforcement Guidelines, during an initial assessment we explore if the case is an administrative priority for Ofcom; and/or the evidence we have justifies opening an investigation, having considered all relevant factors. Ofcom 2022, *Regulatory Enforcement Guidelines for investigations: Draft guidelines for consultation*, paragraph 3.5.

assessments have been summarised in our Framework document and our annual reports monitoring compliance with the net neutrality rules.[120]

Review of zero-rating and our approach

5.16   In this section, we consider the outcomes delivered by our current approach to zero-rating and assess, where relevant, how these align with our overarching policy objectives to safeguard (i) citizens' and consumers' access to an open internet; and (ii) the open internet as an engine of innovation. First, we consider our general position to-date of reviewing zero-rating offers on a case-by-case basis. Second, we evaluate our existing guidance for assessing such offers and consider if any improvements can be made. In doing so, we take account of issues raised by stakeholders in response to our 2021 Call for Evidence, as well as the CJEU rulings and past enforcement cases.

5.17   We have concluded that zero-rating offers are largely beneficial to consumers and that we can now take a lighter touch approach to reviewing such offers, although we recognise that in some limited circumstances there may still be cases that raise concern. We therefore propose to make clearer in our guidance what factors we consider when assessing such offers, including providing clarity of the types of offers we are unlikely to have concerns about.

Our view on zero-rating

5.18   Below we summarise stakeholder views on zero-rating in response to our 2021 Call for Evidence, and examine the potential benefits and adverse effects of zero-rating offers on competition and consumer choice.

Stakeholder views

5.19   Several respondents to our 2021 Call for Evidence remarked on the benefits of zero-rating. For example, several considered that certain consumers had benefitted from ISPs zero-rating access to certain valuable content during the Covid-19 pandemic (e.g., educational websites, NHS content).[121]

5.20   More generally, Google considered zero-rating to be beneficial for end-users and for competition when all traffic and providers are treated fairly. It noted that zero-rating "provides a low-risk way for consumers to try new or unfamiliar content and applications".[122] Meta also thought zero-rating was important for "helping people stay connected with access more consistently".[123] In addition, most mobile providers expressed strong support for taking a permissive approach towards zero-rating, with Three describing it as "a commercial proposition designed to give customers a wider range of choices".[124]

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[120] Available on the Ofcom website here.
[121] For example, see responses from the Communications Consumer Panel and ACOD (pages 2 to 3) and Click Zero (page 3).
[122] Google response to the 2021 Call for Evidence, page 11.
[123] Meta response to the 2021 Call for Evidence, page 3.
[124] Three response to the 2021 Call for Evidence, paragraph 3.7.

5.21   Conversely, a number of respondents expressed concerns that zero-rating offers could be used to undermine the net neutrality framework.

5.22   For example, Netflix supported the availability of offers that are non-discriminatory, but also highlighted the possibility for discriminatory offers to harm competition, particularly where ISPs are vertically integrated and/or attempt to charge CAPs to be zero-rated.[125] The BBC referenced the CJEU rulings, noting that these could indicate "such deals may be against the spirit of the rules, and are potentially detrimental for end-users".[126]

5.23   Channel 4 remarked that zero-rating offers have the potential to be exclusionary, due to the financial resources required to agree to commercial deals.[127] It expressed concern that it is often large technology companies, such as Facebook, that typically sustain such deals. Open Rights Group similarly raised concerns over the potential anti-competitive effects of zero-rating, particularly by enabling platforms to gain an unfair competitive advantage.[128]

5.24   While not raised explicitly in stakeholder responses, we are aware that some have expressed concerns over the zero-rating of Meta's 'Free Basics' app, which provides access to several of Meta's own services (such as Facebook) but also acts as a platform to access services from other CAPs.[129] This has been of particular concern where ISPs provide free unlimited access to the Free Basics app to consumers who otherwise have no access to the broader internet (and so their internet access is limited to services on the platform).[130] Critics of Free Basics claim that it is anti-competitive and undermines the principle of an open internet.[131]

Potential benefits of zero-rating

Increased data usage and certainty

5.25   Zero-rating offers not only give consumers unlimited access to the content that is being zero-rated but they also free up part of their data allowance to use on non-zero-rated content. This can provide extra value to consumers, similar to increasing their data allowance, and for some this will provide greater certainty that they will not exceed their allowance.

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[125] Netflix response to the 2021 Call for Evidence, page 3.
[126] BBC response to the 2021 Call for Evidence, paragraph 28.
[127] Channel 4 response to the 2021 Call for Evidence, pages 3 to 4.
[128] Open Rights Group response to the 2021 Call for Evidence, page 1.
[129] On its website, Meta describes Free Basics as an "open platform" that allows other websites to be accessed via the platform, subject to meeting certain requirements [accessed 16 September 2022]. Mobile providers can partner with Meta to provide zero-rated access to Free Basics.
[130] While Free Basics has not been launched in the UK or in EU countries, it is available in several other countries. One study indicates that in 2019, Free Basics was available in over 60 countries (including 28 countries in Africa). Toussaint Nothias, 2020. *Access granted: Facebook's free basics in Africa*.
[131] For example, Meta whistle-blower Frances Haugen raised concerns in an interview published earlier this year: Núcleo, 2022. *With zero-rating, META prevented open internet from emerging around the world, says Frances Haugen* [accessed 9 September 2022]. Another example is the criticism and controversy surrounding its launch in India, where it was subject to a public campaign that ultimately culminated in India's Telecom Regulatory Authority (TRAI) blocking Free Basics and effectively banning zero-rating practices. Toussaint Nothias, 2020. *Access granted: Facebook's free basics in Africa.* TRAI, 2016. *Prohibition of Discriminatory Tariffs for Data Services Regulations.*

<u>Greater choice of products for consumers</u>

5.26   Along with variations in data allowance, minutes, coverage and speed, zero-rating offers give ISPs another way to tailor retail products to meet customers' different preferences. This can allow ISPs more flexibility to innovate with differentiated retail products that provide consumers with greater choice and access to the content that they value the most.

5.27   This can also increase competition between ISPs. For example, small ISPs or new entrants may be able to distinguish themselves from larger ISPs by using zero-rating offers to present customers with a distinct offering. Such offers may therefore help facilitate their expansion and increase competition in the mobile market. Indeed, several MVNO brands provide all their customers with zero-rated access to certain commercial apps, which may be an attempt to use zero-rating to draw consumers away from the usual large mobile providers (whose flagship brands do not generally zero-rate commercial content for all their customers).[132]

<u>Facilitating CAP innovation and competition</u>

5.28   Zero-rating offers could potentially help CAPs to expand and challenge incumbents. For example, a CAP could partner with an ISP to promote an innovative service (even for a short period of time). This could encourage customers to try the new service, particularly if they would otherwise be put off due to unfamiliarity or uncertainty about how much data the service uses up.

<u>Wider benefits to citizens and consumers</u>

5.29   Zero-rating offers can also be used to ensure access to content that provides wider benefits to citizens and consumers. For example, during the Covid-19 pandemic the largest mobile providers agreed with Government to provide their customers with zero-rated access to websites supporting victims of crime.[133] Such access is beneficial as it ensures victims of crime are not deterred from accessing useful resources if they have limited monthly data allowances. Another example of such beneficial initiatives would be those that aim to provide help and guidance to those likely to experience financial hardship.[134] Zero rating can be particularly beneficial here as low-income consumers are more likely to rely on mobile data for internet access.[135]

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[132] For examples, see the Virgin Mobile website (*Virgin Mobile zero-rated use of messaging apps and Twitter*); the Sky Mobile website (*Sky Mobile zero-rates several Sky-owned apps*); and the VOXI website (*VOXI zero-rates several social media apps*) [accessed 10 October 2022].

[133] The participating ISPs agreed to provide zero-rated access to the following eight websites: Victim Support; Rape Crisis; The Survivors Trust; Male Survivors Partnership; Refuge; National Domestic Abuse Helpline; Women's Aid and Welsh Women's Aid; NSPCC. Gov.uk, 2020, *Data charges removed for websites supporting victims of crime* [accessed 6 October 2022].

[134] For example, earlier this year, Three, Virgin Mobile and O2 expanded their list of zero-rated websites that offer financial advice and guidance: Three website, September 2022, *Three UK expands number of zero-rated websites to further support customers during cost-of-living crisis* and VMO2 website, July 2022, *Virgin Media O2 boosts list of data-free services as part of measures to support customers in cost-of-living crisis* [accessed 8 September 2022].

[135] As noted in our 2021 *Affordability of communications services* report, 5% of households currently only have access to a mobile internet connection at home (1.5 million households). The proportion is higher for those who are unemployed and on low incomes. Ofcom, 2021. *Affordability of communications services: Summary of findings*, paragraph 3.21.

Potential adverse effects of zero-rating

Circumstances under which zero-rating could undermine competition and choice between CAPs

5.30   Zero-rating offers could make it difficult for CAPs to compete effectively, although only when certain conditions are met. While zero-rating can benefit competition, in some circumstances such offers may deter market entry or investment in innovative services. This in turn could have the potential effect of undermining the open internet as an engine for innovation, thereby reducing consumers' choice of CAPs and services, in the long-term.

5.31   This is more likely where the CAP being zero-rated has a degree of market power, insulating it from effective competition. In those circumstances, a zero-rating offer could add to the barriers to entry and expansion for rivals, entrenching the CAP's market power and limiting consumer choice in the long run.

5.32   A harmful outcome for consumers is also more likely when an offer has all of these features:[136]

   (i)   **CAPs are effectively excluded from the offer** – i.e., if any rival CAPs are effectively unable to participate in the zero-rating offer;

   (ii)   **It is important for a CAP to be zero-rated to compete effectively** – i.e., a zero-rating offer is available to a sufficient number of consumers, such that it could have a material impact on how a CAP market operates; and

   (iii) **The offer is likely to influence consumer behaviour** – such that a zero-rating offer is successful in inducing consumers to use zero-rated CAPs as alternatives to non-zero-rated CAPs.

5.33   This harm can only occur if the zero-rated CAP has existing or potential competitors who would otherwise be unable to compete effectively if they were excluded from a zero-rating offer. If zero-rated access is given to content with no likelihood of competition (e.g., most Gov.uk websites, NHS services or other non-competitive services[137]), then the zero-rating offer would not harm the ability of any CAP to compete.[138]

Circumstances under which zero-rating could undermine competition and choice between ISPs

5.34   An ISP with market power could theoretically use a zero-rating offer to bolster its position. For example, if an ISP enters into an exclusive agreement with a CAP (so other ISPs cannot zero-rate the CAP) and consumers thought the CAP was providing must-have content, this may strengthen the ISP's position and could act as a barrier to entry and expansion for rival ISPs. Harm could occur if it is important for rival ISPs to provide zero-rated access to this

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[136] We provide more explanation about why each of these elements are relevant when setting out our proposals for assessing Type Three zero-rating offers in paragraphs 5.60 to 5.71.

[137] For example, if a mobile ISP provides zero-rated access to the web portal that its customers use to manage their account and top-up their data, this in no way undermines the ability of other firms to complete, as only a consumer's existing mobile ISP can provide this service.

[138] Click Zero's response to the 2021 Call for Evidence (page 2) identified a similar point. It suggested that because the zero-rating of digital services delivered by the State are not motivated by "a commercial or competitive interest", the zero-rating of such services does not distort open internet principles.

must-have content, in order to compete effectively (such that competing by simply offering larger monthly data allowances would be an inadequate substitute to zero-rating).

5.35   However, we consider that this is unlikely in current circumstances given that competition in the UK retail mobile market, where zero-rating is most prevalent, continues to be generally effective.[139] As such, mobile providers are unlikely to be able to use zero-rating offers to strengthen their market position, particularly since other providers can compete by offering tariffs with larger or unlimited data allowances. In line with this, no ISPs raised concerns in their 2021 Call for Evidence responses regarding the potential impact of zero-rating on competition in ISP markets.

5.36   Overall, our analysis and stakeholder views lead us to conclude that zero-rating can be largely beneficial to consumers, although we recognise there may be concerns in limited circumstances. We take this into account when setting out our proposals below (see paragraphs 5.47 to 5.71).

Our existing approach to zero-rating offers

Stakeholders' views

5.37   In response to our 2021 Call for Evidence, some stakeholders expressed a general desire for greater clarity on zero-rating from Ofcom, including for us to provide clearer guidance on what cases we would consider to be harmful.

5.38   Several respondents highlighted the uncertainty created by the 2021 CJEU rulings. In particular, they sought clarification on our position on the rulings and the implication of those rulings that most zero-rating practices are contrary to the general obligation of equal treatment of traffic under Article 3(3) of the net neutrality rules. A few remarked that the existing zero-rating framework is too inflexible,[140] while Three questioned the number of questions mobile providers are meant to consider when assessing whether a zero-rating offer influences the end-users' exercise of rights.[141]

Our experience of zero-rating enforcement to date

5.39   To date, we have had very limited concerns about zero-rating offers that are open to CAPs of the same class.[142] These types of offers are less likely to effectively exclude CAPs that compete with each other, and so they are unlikely to influence consumers' decisions about which CAPs to use, and materially reduce consumer choice in the long term. We therefore

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[139] Earlier this year we set out our initial views on the UK mobile market. Ofcom, 2022. *Ofcom's future approach to mobile markets: a discussion paper*. Subsequent references are to this publication.

[140] Vodafone described the current rules as "inflexible and unable to adapt to changes in technology or circumstances". Vodafone response to the 2021 Call for Evidence, paragraph 29.

[141] Three response to the 2021 Call for Evidence, paragraphs 3.6 to 3.10.

[142] This means that the zero-rating offers are open to all CAPs of a particular class or category of content. A definition is set out in the 2020 BEREC Guidelines (paragraph 42) explains that a "zero-rating programme which is open to all CAPs of a particular class is referred to in these guidelines as an "open programme"".

had limited concerns about offers, such as EE's Music and Video Passes, once we established that they were open to other CAPs to join.[143]

5.40   Our experience of reviewing offers has also given us a clearer understanding of when we are more likely to have concerns. For example, we have examined offers more closely when ISPs and zero-rated CAPs are vertically integrated (i.e., ISPs zero-rate their own content) or when there is zero-rated access to data-heavy content (particularly video streaming).[144]

Changes in the EU's approach to enforcement for zero-rating offers

5.41   While we are mindful of the CJEU rulings and BEREC's revised position, we consider that the net neutrality rules do not prohibit ISPs from offering zero-rating offers to customers – including where these offers zero-rate specific applications or categories of traffic (or 'class-based' offers, such as the zero-rating of all video streaming content).

5.42   As explained in Section 2, we are no longer required to take utmost account of the BEREC Guidelines, although we can continue to have regard to them where we consider this to be appropriate. In addition, CJEU rulings handed down after the UK left the EU do not have binding effect in the UK, although UK courts may still choose to take account of these rulings where they consider them to be relevant.

5.43   As discussed above, we consider that zero rating offers are generally beneficial to consumers, although in some limited circumstances they can risk reducing consumer choice, by undermining the ability of CAPs to compete effectively. We therefore consider that such offers can continue to be offered in such a way as to be compatible with the obligations under Article 3 of the Regulation. As such, we propose to continue to assess zero-rating offers on a case-by-case basis, taking into account their likely effects on end-users and whether such offers are in contravention of Articles 3(1) and 3(2), taking Article 3(3) into account where appropriate.

Review of our current guidance on zero-rating offers

5.44   As set out previously, our objectives are to ensure that zero-rating offers do not infringe on end-users' rights under Article 3 of the Regulation, and that end-users' choice is enhanced such that they continue to reap the benefits of an open internet, by having access to a range of CAPs and innovative services. Zero-rating offers that undermine effective competition in CAPs' markets will reduce the availability of CAPs and innovation in the long-term. Therefore, our guidance should focus on identifying offers that could undermine the ability of CAPs to compete effectively.

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[143] Ofcom, 2020. 2020 Annual Report: Monitoring compliance with the EU Open Internet Regulation, paragraphs 3.9 to 3.13.
[144] For example, we have previously considered two such cases: in 2018/9 when we reviewed EE's offer of zero-rated access to its BT Sport app and in 2019/20, when we reviewed Sky Mobile's offer of zero-rated access to various Sky Apps. In both cases, we noted we had concerns about the presence of vertical integration and the data usage nature of video streaming, although we ultimately considered that the offers did not appear to materially affect consumer choice.

5.45   As explained above at 5.6 to 5.9, in 2019 we published our framework for assessing zero-
        rating offers, including the factors we will generally consider as part of our analysis.[145] In
        response to stakeholders' request for greater clarity, we consider that certain aspects of
        the guidance could be updated and simplified for the benefit of ISPs. In particular, we
        consider the guidance would be more useful if:

- The different steps in the assessment process helped ISPs to identify what offers are
  unlikely to be of concern and therefore are not required to be considered further; and
- The factors that we consider most relevant to assessing if an offer is likely to be of
  concern were set out more explicitly.

Conclusions on zero-rating

5.46   Zero-rating offers allow consumers to benefit from a greater choice of products, although
        in limited circumstances they may have the potential to reduce consumer choice by
        undermining competition in CAP markets. We do not consider that such offers are likely to
        undermine ISP competition in current conditions in the UK. We therefore propose to
        continue with our current approach of assessing such offers on a case-by-case basis, but to
        revise our guidance and clarify what types of offers are more or less likely to raise
        concerns.

Our proposals

5.47   We propose to replace our existing 2019 zero-rating framework with new guidance, setting
        out that we will continue to take a case-by-case approach to assessing zero-rating offers,
        while clarifying that we are only likely to have concerns in limited circumstances.
        Specifically, our updated guidance seeks to make clear to ISPs (i) two types of offers that
        are unlikely to give rise to concerns; and (ii) a third type of offer with factors we may
        consider when evaluating if it is likely to raise concerns under the net neutrality rules.

5.48   To provide clarity, we propose to define three types of zero-rating offers based on the
        likelihood that each will result in concerns:

a) '**Type One' zero-rating offers** are those where ISPs zero-rate access to information and
    services from public sector bodies (e.g., the Government, NHS) that provide a public
    benefit and are not in competition with other suppliers. This type of offer is beneficial
    to consumers and is unlikely to have a detrimental impact on other CAPs. Therefore,
    once we are satisfied that an offer is a Type One zero-rating offer, we are unlikely to
    consider them any further.

b) '**Type Two' zero-rating offers** are offers that are genuinely open to all CAPs of a
    particular class. They are unlikely to reduce the choice of CAPs available to consumers,
    as any equivalent CAPs will be able to join should they so wish. Once we are satisfied

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[145] As part of the Framework document.

that an offer is a Type Two zero-rating offer, we are unlikely to consider them any further.

c) **'Type Three' zero-rating offers** are all other offers that do not meet either the Type One or Type Two criteria. We will continue to monitor and review such offers, were appropriate, on a case-by-case basis, taking into account a range of factors to determine if they are likely to raise concerns that would warrant opening a formal investigation.

Type One – Beneficial content from public bodies with no competitors

5.49   In recent years, ISPs have increasingly provided zero-rated access to content from public bodies that is socially beneficial. For example, during the Covid-19 pandemic many mobile providers zero-rated access to NHS websites, which was aimed at ensuring everyone could get health information and advice about coronavirus that was verified, up to date and free from misinformation.[146]

5.50   Given the wider benefits that zero-rating this type of content provides to citizens and consumers, we want to ensure ISPs and public sector organisations understand that we are unlikely to have concerns in such cases. For content provided by public sector organisations that rarely face competitors or have commercial incentives, zero-rated access to such content typically has no prospect of undermining effective competition.

5.51   Once it is established that an offer only provides zero-rated access to beneficial content from public bodies with no competitors, we propose to generally not carry out any further assessment, in the absence of any complaints or concerns being raised with us.

Criteria required to be classified as a Type One offer

5.52   A zero-rating offer will be classified as Type One if it has all of the following features:

a) **Socially beneficial** – the information or services that are being zero-rated clearly provide social benefit to citizens and consumers. This could include, for example, public health information or benefit claims sites.

b) **Public sector organisation** – the information or services that are being zero-rated are provided by a public sector body not operating in a commercial capacity. This would include the Government, as well as other public institutions such as local authorities and government agencies.[147]

c) **Absence of competition** – due to the type of content, there is no competing supplier that provides, or is capable of providing, a comparable alternative to the information or services being zero-rated.

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[146] UK Government, 2020. *Mobile networks remove data charges for online NHS coronavirus advice* [accessed 14 September 2022].
[147] The UK departments, agencies and public bodies set out on this website are likely to fall under this criterion. UK Government website, *Departments, agencies and public bodies* [accessed 14 September 2022].

5.53   Below we set out a hypothetical case study of a zero-rating offer with Type One features.

> **Case study A (Type One) – Information on State Pension from Gov.uk**
>
> A mobile provider gives all of its customers zero-rated access to Gov.uk information on State Pensions, including information on what other financial support citizens can get when planning their retirement income. The provider explains that zero-rated access to this type of advice could benefit low-income customers, by raising awareness of practical advice and Government initiatives that can assist those struggling financially (e.g., advice on Pension Credit, Housing Benefit etc.). There are no competing suppliers on State Pension issues.
>
> Taking into account our proposed framework, such an offer would meet all Type One criteria, and would therefore be unlikely to need further consideration:
>
> **(a) Socially beneficial** – the zero-rating offer could widen and increase access to information that could help those struggling to plan for retirement.
>
> **(b) Public sector organisation** – the information is provided by Government via the Gov.uk site.
>
> **(c) Absence of competition** – There is no competitor that provides similar information and services on State Pension.

Type Two – Open zero-rating offers

5.54   Zero-rating offers are unlikely to raise concerns if it is made clear that all CAPs of the same class can also be zero-rated on request. As explained below, such offers are unlikely to materially reduce consumer choice of CAPs. Once it is established that an offer is open, we propose that we will not normally carry out any further assessment, in the absence of any complaints or concerns being raised with us.

Type Two offers should limit the potential for CAPs to be effectively excluded

5.55   A zero-rating offer could harm consumer choice by undermining effective competition in CAP markets if: (i) relevant CAPs are effectively excluded; (ii) it is necessary to compete effectively in a market; and (iii) it influences consumer behaviour. Open offers are unlikely to cause harm as relevant CAPs are unlikely to be excluded from relevant offers. Any CAPs can equally take advantage of the benefits of zero-rating by simply joining the offer.

5.56   For a zero-rating offer to be open (and therefore qualify as a Type Two offer), it is important that relevant CAPs are not deterred from joining. If CAPs were required to pay a fee to be zero-rated, smaller CAPs with limited resources may be deterred from participating, even if the fee was fairly modest. In addition to payment requirements, stringent technical, legal or other financial requirements could also deter relevant CAPs from participating in an offer and therefore particularly disadvantage smaller CAPs. By contrast, a zero-rating offer is less likely to reduce consumer choice if there are easily achievable requirements for CAPs to join the offer.

5.57 It is also important for these offers to be transparent. The process for joining should be straightforward and publicly available so that new CAPs can easily find this (e.g., on the ISP's website).[148] Details about zero-rating offers should also be outlined on the ISP's website to (i) ensure that CAPs are aware of offers that are relevant to them; and (ii) assist Ofcom's enforcement work, ensuring that we can identify offers that could raise concerns.

Criteria required to be classified as a Type Two offer

5.58 A zero-rating offer will be classified as Type Two if it has all of the following features:

a) **Class-based** – The offer is open to CAPs of a particular class, as opposed to a single CAP.

b) **Absence of undue requirements to join** – CAPs of the same class should be able to apply to join the offer without any undue requirements (e.g., financial, legal or technical). [149] To meet this requirement, we would expect ISPs not to request payments from CAPs as this may deter some CAPs from joining.

c) **Non-discriminatory treatment** – All CAPs included (or seeking to be included) in the zero-rating offer should be treated equally, including any CAPs owned by the ISP.

d) **Transparency for CAPs and timely responses by ISPs** – The process for a CAP to join the offer should be clear and publicly available. This should include an accurate description of the process for joining and relevant contact details. We would also expect a timely response to any request by a CAP to join an offer.

e) **Transparency for consumers** – The ISP must make clear to its customers which CAPs are zero-rated as part of their mobile tariff (including what aspect of a CAP's content is zero-rated).[150] This information should be made available on the ISP's website. This should include information on legacy contracts (i.e., contracts which are still active, but not being offered to new customers). We also expect updates to be provided to customers whenever new relevant CAPs join the class-based zero-rating offer.

5.59 Below we set out a hypothetical example of a zero-rating offer with Type Two features.

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[148] An example of this is the EE website, which provides CAP applicants with an email address to contact: EE, *What is the EE Data Pass?* [accessed 13 October 2022].

[149] When we say there must not be any "undue" requirements, we expect compliance with all requirements must be necessary in order for the zero-rating offer to function and be technically possible.

[150] An example of a transparent offer is Vodafone's VOXI 'Unlimited Social Media' offering, where zero-rated access is provided to Facebook Messenger, WhatsApp, and Instagram. However, the website clarifies that "making and receiving voice and video calls on Facebook Messenger, WhatsApp, and Instagram is not included in Unlimited Social Media". VOXI, *What's included in Unlimited Social Media?* [accessed 16 September 2022].

> ### Case study B (Type Two) – Open video streaming services zero-rating offer
>
> A mobile provider's customers have the option to pay extra for zero-rated access to four different video streaming services. This offer does not include all such services in the market. However, the provider provides a relatively simple means for other CAPs to join the zero-rated offer and does not charge CAPs to join the offer. The provider's website has information on who to email to join the offer, as well as up-to-date information on which CAPs are currently zero-rated and gives an indication of how quickly applications will be addressed.
>
> Taking into account our proposed framework, this offer would meet all Type Two criteria and would therefore be unlikely to need further consideration:
>
> **(a) Class-based** – it is a class-based zero-rating offer (i.e., providing zero-rated access to video streaming content, as opposed to a single CAP).
>
> **(b) No undue requirements to join** – other video streaming services can join without making monetary payments or having to meet any requirements that are unduly burdensome.
>
> **(c) Non-discriminatory treatment** – all CAPs included in the offer appear to be treated equally, with no evidence that the entry terms vary for different CAPs.
>
> **(d) Transparency for CAPs** – an email address is listed for CAPs to contact about joining the offer.
>
> **(e) Transparency for consumers** – the mobile provider has an information page on its website, where it sets out which CAPs are zero-rated as part of the offer.

Type Three – Other zero-rating offers

5.60   Zero-rating offers that do not meet either the Type One or Type Two criteria will be classified as Type Three offers. We propose to replace the three-step approach in our current guidance with a non-exhaustive list of factors that we will consider in the round when assessing if a Type Three offer is likely to contravene the net neutrality rules. As is the case in all areas where Ofcom exercises enforcement functions, we will decide where best to focus our resources by applying our administrative priority framework in deciding which cases to take forward and what actions to take.[151]

5.61   We propose to focus on identifying any zero-rating offers that are likely to undermine CAPs' ability to compete effectively and in turn could materially reduce consumers' choice of CAPs and services in the long-term.

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[151] Ofcom, 2022. *Regulatory Enforcement Guidelines for investigations: Draft guidelines for consultation*, paragraph 3.6. The administrative priority matters we will generally consider are (i) the risk of harm or seriousness of the alleged conduct; (ii) strategic significance of addressing the alleged conduct; and (iii) resource implications of conducting an investigation.

5.62   We therefore outline a list of factors that will help us assess whether the zero-rating offer is likely to have a material impact on consumer choice:[152] (i) whether relevant CAPs are excluded from a zero-rating offer; (ii) whether zero-rating is important for a CAP to compete effectively in a market; and (iii) whether the offer is likely to influence consumer behaviour. For those offers that are likely to have a material impact on consumer choice, we then highlight the factors that will help us assess whether the impact is likely to be positive or negative for consumers and citizens, notably the presence of market power, and broader policy considerations.

5.63   Not all factors will be relevant or need to be evaluated for all offers, and additional factors may need to be considered in certain cases. We will consider any relevant factors in the round. We explain these factors below and outline a case study to illustrate the sorts of factors we would look to consider in the round when reviewing offers.

Relevant CAPs are effectively excluded from the zero-rating offer

5.64   We would consider the extent to which a zero-rating offer excludes a relevant CAP and undermines its ability to compete by assessing:

- **Openness of a zero-rating offer** – The more CAPs included in a zero-rating offer and the easier it is for CAPs to join, the less likely it will undermine the ability of CAPs to compete effectively. Even if an offer does not meet all the Type Two criteria, those criteria would still be relevant when assessing the degree of openness of a Type Three offer and whether it may undermine certain CAPs' ability to compete.

It is important for a CAP to be zero-rated in order to compete effectively

5.65   Even if a CAP is excluded from a zero-rating offer, if only a small number of consumers actually make use of the offer, the overall impact of the offer may not be sufficient to materially affect the non-zero-rated CAP's ability to compete. However, if zero-rated access to a certain class of content was pervasive among consumers, a CAP of the same class may otherwise find it difficult to compete effectively. Therefore, we may consider:

- **Scale of take-up** – the higher the overall take-up of a zero-rating offer by consumers, the higher its potential impact on competition in a CAP market. The take-up could be measured by the proportion of UK customers who has zero-rated access to the same CAPs.[153]

- **Duration of the offer** – when zero-rated access to a CAP is only provided for a short-duration (e.g., a limited trial period) the offer is unlikely to have an impact on how a CAP market operates in the long-term. However, a CAP market is more likely to be affected if consumers have zero-rated access to a CAP for a sustained or indefinite period of time.

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[152] These are factors relevant to the three elements identified in paragraphs 5.30 to 5.33.
[153] We recognise that take-up could be high due to either many customers of a single large ISP having zero-rated access, or customers of several different ISPs having zero-rated access.

The offer is likely to influence consumer behaviour

5.66   Even if relevant CAPs were excluded from a zero-rating offer and zero-rated access was pervasive among consumers, a CAP's ability to compete would not be materially affected if consumers' behaviour is unlikely to be influenced by the offer. We expect consumers are most likely to be influenced by an offer when they are cautious about their data usage, and therefore seek to minimise deductions to their data allowance by using zero-rated CAPs. While an offer that influences consumer behaviour would not necessarily automatically raise concerns, we may consider the following factors:

- **Data scarcity** – We may consider how much spare data the typical consumer with that zero-rating offer is likely to have in each month. This will be driven both by their monthly data allowance and the amount of data that they typically use.[154] The larger their data allowance and the less data they typically use (and so the less scarce data will be for them), the less likely it is that an offer would influence their choice of CAP.

- **Data usage of zero-rated CAPs** – The heavier the data usage for a zero-rated CAP, the more likely it is that consumers will prefer to use zero-rated CAPs, in order to preserve their data allowance. As part of this, it will be relevant to consider if using a CAP is highly reliant on mobile data (as opposed to Wi-Fi internet access), as the zero-rating of such CAPs is more likely to influence consumers' choice of which CAP to use.[155]

- **Other relevant features of an offer** – Other factors could compound the effect that a zero-rating offer may have. For example, if an ISP provides free or discounted access to a CAP (which normally requires a subscription) in addition to zero-rating the CAP, the potential for the offer to influence consumer behaviour will increase.

5.67   Once we establish that an offer is likely to have a material impact on consumer choice, we will also have regard to other factors related to market dynamics, as well as broader policy considerations. These are relevant in order to determine whether the offer is likely to have a positive or negative impact on consumers and citizens. These two further sets of factors are set out below.

Market position and market dynamics[156]

5.68   The market position of ISPs or CAPs (i.e., their size, capabilities and relative constraints from their competitors) may potentially give them a degree of market power over consumers. We are likely to be more concerned about zero rating offers where the CAP or

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[154] To determine whether consumers are likely to be concerned about data scarcity, we may consider evidence on data allowance and usage of consumers who take up the offer, as well as average monthly data usage by UK consumers (where such information is available).

[155] For example, ride-hailing services (e.g., Uber, Bolt) are more likely to be dependent on using mobile data (as opposed to Wi-Fi data) as consumers are likely to be outside the home when using such CAPs.

[156] When assessing the market position held by either a zero-rated CAP or a zero-rating ISP, we intend to broadly consider the extent to which alternatives exist to these firms and their overall use by consumers. We do not intend to undertake a full market definition exercise and economic assessment similar to a Competition Act case. Nor are we seeking to establish if a firm possesses 'significant market power', as defined in the Communications Act.

ISP has market power, as they may be able to use the zero-rating offer to entrench that market position. We may therefore consider:

- **Market position of the zero-rated CAP** – CAPs with a strong market position are more likely to have the ability and incentive to use zero-rating offers to stifle competition and undermine smaller CAPs in order to preserve their strong existing position. In contrast, where the offer relates to a smaller, challenger CAP competing against a rival with a strong established position, it is more likely to have a pro-competitive impact.

- **Market position of the zero-rating ISP** – All ISPs hold a gatekeeper position over their customers, providing them with a degree of market power over CAPs in the short run.[157] However, we expect that in a competitive market, consumers will be able to choose from a range of ISPs that suit their needs, and that competition will likely incentivise ISPs to use zero-rating to offer consumers greater choice of CAPs, rather than limiting them. Conversely, an ISP with a strong market position would be better able to give preferential treatment to a narrow selection of CAPs (by zero-rating them). Also, a zero-rating offer from an ISP with a large market share is more likely to have high take-up, given its number of subscribers.

- **Vertical Integration** – A vertically-integrated ISP-CAP will have a greater incentive and ability to create a zero-rating offer that could give itself an advantage over rival CAPs (so-called 'self-preferencing').[158] The larger such an ISP's subscriber base is, the more likely it could successfully leverage its position in the ISP market to the advantage of its CAP business with a zero-rating offer. Such behaviour may disadvantage rival CAPs and increase barriers for CAPs looking to expand in the market.

- **Characteristics of the CAP market** – Zero-rating offers could compound or reduce the barriers to entry (or expansion) in certain CAP markets, depending on whether they apply to incumbents or challengers.[159] For example, in markets with strong network effects,[160] zero-rating offers applied to incumbents can add to these barriers and strengthen the existing market position of the incumbent CAP. Furthermore, in nascent markets, such offers may increase the chance of the market tipping towards CAPs that are zero-rated, if these CAPs have market power in adjacent markets which they could leverage, to make it hard for new CAPs to enter and/or expand.

Other benefits to citizens and consumers

5.69 The factors above relate to whether a zero-rating offer could affect CAPs' ability to compete effectively, which in turn may materially affect consumer choice. However, at

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[157] We explain the effects of ISPs having a "gatekeeper position" in Section 4 at paragraphs 4.6 to 4.12.
[158] Self-preferencing is where a company gives preferential treatment to its own services when they are in competition with the services provided by other companies.
[159] As noted in the Government's proposed reforms for a Digital Markets Unit, digital markets can have features that increase barriers to entry. See HM Government, 2021. *A new pro-competition regime for digital markets;* and HM Government, 2022. *Government response to the consultation on a new pro-competition regime for digital markets*.
[160] Network effects are relevant when the value that a consumer gets from a CAP directly depends on its number of users. E.g., a social media platform used by half the UK population is far more useful than if it only had a dozen users. In such markets new entrants will face a challenge, as they will need to first gain a sufficient number of users to become a useful platform. However, attracting customers will be difficult given its starting customer base is likely to be small.

times it will also be important to consider factors unrelated to competition when making enforcement decisions. In particular, even if an offer does not meet all of the Type One criteria and so raises potential concerns, we will still consider other citizen benefits where relevant. Some examples of such benefits we may consider include:

- **Health and safety** – we will recognise the inherent benefit that zero-rated access to certain websites provide to improving UK citizens' health and safety (e.g., charity helplines, mental health support, support for victims of crime[161])
- **Assisting low-income consumers** – we will recognise the benefit when zero-rating offers assist low-income consumers who are more likely to depend on mobile data, by increasing their access to relevant content (e.g., zero-rated information from Citizens Advice).

We will consider relevant factors in the round during assessments

5.70   When assessing if a zero-rating offer would materially reduce consumers' choice of CAPs and services in the long-term, our decisions will not be based on a single factor. Instead, we will consider any relevant factors in the round when reviewing Type Three offers. Therefore, even if certain elements of an offer indicate that it could be problematic,[162] it will not automatically be found to be in breach of the Regulation. This is because once we consider the overall effect of the different relevant factors, we may conclude that the offer is either unlikely to have a material impact on consumer choice, or that the overall impact is likely to be positive for consumers.

5.71   Below is a hypothetical example of a Type Three zero-rating offer and the kinds of factors we may consider in the round as part of any assessment.

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[161] During the Covid-19 pandemic, several large mobile providers agreed with Government to provide zero-rated access to a number of informational websites supporting victims of crime: Victim Support; Rape Crisis; The Survivors Trust; Male Survivors Partnership; Refuge; National Domestic Abuse Helpline; Women's Aid and Welsh Women's Aid; NSPCC. Gov.uk, June 2020. *Data charges removed for websites supporting victims of crime* [accessed 6 September 2022].
[162] For example, if the take-up of the offer is potentially high due to the mobile provider having a large share of the market, or the data usage associated with the zero-rated content is heavy due to involving video streaming.

Case study C (Type Three) – Vertically integrated provider of video streaming

A vertically integrated mobile provider (with a large share of the retail mobile market) offers its customers a free three-month subscription to its own video streaming app. During this period, the provider also zero-rates content watched via the app. The app is a major player in the video streaming market, although other prominent competitors exist. Evidence suggests that customers with the offer typically watch this content at home.

Under our proposed framework, this offer would not meet the proposed Type Two criteria, as the mobile provider is only zero-rating its own content. As such, it is an example of a Type Three offer where we would consider relevant factors to decide if it is likely to raise concerns under the Regulation. Such factors would likely include:

- **Vertical integration** – this is a large vertically integrated mobile-CAP, which is self-preferencing its own content. This means it has an incentive to undermine competition in the video streaming market and it is leveraging its position in the retail mobile market to strengthen its position in the video streaming market.

- **Data usage** – as the data usage associated with video streaming is relatively high, the offer might be more likely to influence consumers' behaviour. However, consumers are more likely to view video streaming content at home and so are more likely to rely on Wi-Fi to access this type of content.

- **Duration** – as the offer is only provided for a relatively short duration (three months), it is unlikely to discourage consumers from accessing alternative video content in the long-term.

In reaching a conclusion on this case, we would consider these factors in the round, but may place particular weight on the evidence relating to people using the video streaming service at home and the short duration of the offer.

Approach to zero-rated access once a data allowance has been exhausted

5.72   As set out in Section 2, Article 3(3) of the Regulation requires ISPs to treat all traffic equally, subject to certain conditions and exceptions. This requirement effectively prohibits ISPs from continuing to zero-rate certain apps and websites when all other content is blocked (or slowed down) once the customer's data cap is reached.

Stakeholders' views

5.73   A number of stakeholders raised this issue in their 2021 Call for Evidence responses. [✂] argued that a more permissive approach, which would allow zero-rated access to certain content and applications when a customer runs out of data, would allow much greater scope for the development of new services that would benefit consumers.[163] Others such as BT took the view that zero-rated access to Oak National Academy, BBC Bitesize and NHS COVID sites during the Covid-19 pandemic "had to be made in breach of the net neutrality rules that require ISPs to switch off these zero-rated sites for customers when the customer reaches their data cap".[164]

5.74   In addition, Meta specifically requested we provide additional flexibility for consumers that have "exhausted their data balance or have not yet purchased data in the first place", in order to continue to access zero-rated content. It argued that this would "help under-connected consumers in the UK stay connected more consistently with access to important online resources." It suggested that we consider continued access for such consumers as "one factor in the holistic review", as opposed to being an automatic breach.

Our current approach to enforcement

5.75   In the case of one zero-rated educational offer (which customers had continued access to after they had used up their monthly data allowance) that was brought to our attention, we decided that no further action was appropriate due to the limited impact the potential breach of Article 3(3) was likely to have on customers.[165]

5.76   We have also previously set out our position on ISPs continuing to zero-rate emergency video relay for British Sign Language (BSL) users when access to the internet is otherwise blocked, taking the view that access to this service should take priority and, if ISPs do make it available in these circumstances, this is unlikely to be something Ofcom would object to on policy grounds.[166] We discuss how we propose to address this ongoing issue for emergency video relay (and emergency communications more generally), in Section 9.

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[163] [✂].
[164] BT Group response to the 2021 Call for Evidence, paragraph 6.
[165] We separately advised the relevant ISP to ensure that other providers of educational resources were able to join the offer. Ofcom, *2021 Annual monitoring report*, paragraphs 3.12 to 3.13.
[166] Ofcom, 2021. *Statement: Emergency video relay.*

5.77   We also take the view that allowing customers to top up their data when this has run out (e.g., via an ISP web portal or app) is unlikely to be problematic and we should adopt a practicable approach to the application of Article 3(3) in this instance. A strict interpretation would be impractical as it would greatly restrict consumers' ability to buy more data when they have run out.[167]

Review of the benefits and adverse effects of allowing zero-rated access once the data allowance has been exhausted

5.78   In principle, we consider allowing access to zero-rated content after a customer has exhausted their data allowance would have the same benefits and raise similar concerns as zero-rating offers generally.

5.79   As a result, there could be consumer benefit in allowing zero-rated access once the data allowance has been exhausted, providing the overall impact of the specific offer is likely to be positive for consumers against the criteria set out above. For example, consumers that value the improved certainty that zero-rating provides, would benefit from the certainty that they would always be able to access the zero-rated content. Furthermore, zero-rating offers can provide a wider societal benefit by ensuring all consumers have access to certain types of beneficial services (e.g., debt advice or emergency communications) that are available to all consumers, at all times.

5.80   We recognise that certain types of zero-rated access past the data allowance could be potentially problematic. For example, if many consumers had no data or a very low monthly data allowance, and once data is exhausted there was zero-rated access to only a single CAP or platform, this could adversely affect competition and consumer choice. This is because many consumers would effectively have a sub-internet service controlled by the single CAP or platform, where their access to the wider internet is barred and the openness of the internet is eliminated.

5.81   However, under our proposed approach to Type Three zero-rating offers, we would already be likely to identify such an offer (where consumers have a limited monthly data allowance) as having the potential to undermine competition and materially reduce consumer choice. As a result, we consider that our proposed approach already provides us with a framework to identify problematic sub-internet style offers.

Current position on allowing zero-rated access past the data allowance

5.82   In principle, we recognise that there would be benefits in allowing zero-rated access to continue once the data allowance has been exhausted (subject to certain concerns discussed above). As this is prohibited by the net neutrality rules on traffic management,

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[167] As noted previously at footnote 137, given that this is a service that can only be provided by a customer's existing ISP, relevant competitors are not being effectively excluded by zero-rating a web portal for customers to top up their data allowance.

this is not something we can amend as part of our guidance – it would require a change to legislation which would be a matter for Government and Parliament.

5.83   However, we propose to make it clear in our new guidance that we are unlikely to consider enforcement a priority where the zero-rated content that can still be accessed is limited to:

   i)   Access to the ISP's own website or application in order for a user to top-up the data allowance; or

   ii)   Access to Type One content and emergency communications (as explained in Section 9).

5.84   We welcome views from stakeholders on this issue and any evidence they can provide.

Consultation questions

Question 1: Do you agree with our assessment of zero-rating offers and our proposed approach?

Question 2: Do you agree with the criteria we use to define Type One, Type Two and Type Three zero-rating offers and our proposed approach to such offers?

Question 3: Do you agree with the approach in our guidance in Annex 5 in relation to zero-rating?

Question 4: What are your views on whether zero-rated content should be able to be accessed once a customer's data allowance has been used up?

Please provide any further evidence you have to support your responses.

6. Traffic management

Introduction

6.1   In this section, we assess the effectiveness of the net neutrality framework on traffic management and consider how well it supports our regulatory objectives of safeguarding the open internet, open internet-based innovation, and well-run, efficient and robust networks.

- We first set out the relevant background to our assessment in this section, including the regulatory net neutrality framework and our enforcement of it to date.
- We then consider if the current net neutrality framework on traffic management is delivering good outcomes and achieving the objectives of this review.
- Finally, we set out our proposals on how the net neutrality framework on traffic management could be updated to improve outcomes to consumers and citizens.

6.2   In summary:

- To date, the net neutrality framework on traffic management has been an important safeguard of the open internet, given the gatekeeper position that ISPs hold. These concerns remain relevant going forward, and our policy assessment and proposed approach reflect this.
- Furthermore, as ISPs' investment has generally met the increasing demands on networks, there has been a limited need for ISPs to manage traffic to address congestion or otherwise ensure robustness of their networks.
- However, considering how the demands on networks might evolve going forwards, more flexibility and clarity on how the traffic management rules apply is needed to ensure that networks are run in an efficient and robust manner and are generally fit to meet the needs of citizens and consumers in the future. Specifically:
  - The current framework is at risk of being too restrictive and lacking clarity with regards to when traffic management is permitted to implement retail offers with different quality standards (such as latency, jitter and packet loss). We therefore propose to clarify in guidance the permissible traffic management measures to enable these retail offers. This proposal also contains a number of measures in relation to transparency and meeting contracted levels of quality to ensure consumers are sufficiently protected, as well as improved regulatory monitoring and reporting. We also consider retail packages in which specific CAPs are differentiated on the basis of quality, although this would require a change to the rules themselves.
  - The current framework is also at risk of being too restrictive and lacking clarity with regards to when traffic management can be used to address congestion. We therefore propose to clarify when traffic management is permissible to prevent and/or mitigate congestion, and how such measures can meet non-discrimination and proportionality requirements. We consider that further clarity will provide ISPs

with more flexibility in addressing congestion. This proposal also contains a number of measures to ensure consumers are sufficiently protected, as well as improved regulatory monitoring and reporting. We then consider the case for a more focused approach to traffic management to address congestion which would require a change to the rules themselves.

6.3   An issue closely related to the traffic management framework is whether the framework should permit ISPs to charge CAPs for carrying or prioritising traffic delivered as part of an internet access service. We discuss the issue of charging in Section 7.

Background

The regulatory framework on traffic management

6.4   As set out earlier in Section 2, Article 3(3) of the Regulation sets out specific obligations in relation to traffic management measures: *"providers of internet access services shall treat all traffic equally, when providing internet access services, without discrimination, restriction or interference, and irrespective of the sender and receiver, the content accessed or distributed, the applications or services used or provided, or the terminal equipment used".*

6.5   This Article therefore focuses on safeguarding the open internet and requires ISPs to treat all traffic equally when providing internet access services.[168] This requirement is the core element of the rules on traffic management, as it seeks to limit the ability of ISPs to exploit the gatekeeper position they hold between their customers and the CAPs that want to deliver content and services to these customers. As set out in Section 4, we consider that concerns about the position of ISPs that the net neutrality framework seeks to address will remain relevant going forward, and therefore our policy assessment and proposed approach reflects this.

6.6   Article 3(3) also contains exceptions which allow ISPs to depart from the requirement to treat all traffic equally. These exceptions, to a degree, account for the importance of efficient network use. Specifically:

- Article 3(3) allows ISPs to implement 'reasonable traffic management' measures where the objective is "*to contribute to an efficient use of network resources and to an optimisation of overall transmission quality responding to the objectively different technical quality of service requirements of specific categories of traffic, and thus of the content, applications and services transmitted*".[169] To be considered 'reasonable' traffic management, measures need to meet four cumulative criteria:[170]

  – they must be transparent, non-discriminatory and proportionate;

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[168] Article 3(3), first subparagraph of the Regulation.
[169] Recital (9) of the Regulation.
[170] Article 3(3), second subparagraph of the Regulation.

- they must not be based on commercial considerations, but on objectively different technical quality of service requirements relating to the specific categories of traffic;
- they must not monitor the specific content; and
- they must not be maintained for longer than necessary.

- Article 3(3) also allows ISPs to go beyond 'reasonable' traffic management measures in very limited exceptional circumstances.[171] Such measures must be necessary, and applied only for as long as necessary, in order to:

    - comply with UK law;
    - preserve the integrity and security of the network, services, or terminal equipment of the end users; or
    - prevent impending network congestion and mitigate the effects of exceptional or temporary network congestion (but not recurrent and more long-lasting network congestion which is neither exceptional nor temporary), provided that equivalent categories of traffic are treated equally.[172]

6.7   The above provisions may also impact the efficiency of network use by effectively constraining commercial relationships between ISPs and CAPs. In particular, they do not permit ISPs to charge CAPs for carrying or prioritising traffic and take account of commercial considerations in their traffic management. We discuss charging further in Section 7.

6.8   Articles 4 and 5 of the Regulation are also relevant in terms of traffic management:

- Article 4 of the Regulation sets out a number of related transparency obligations on ISPs, including the requirement to ensure transparency of traffic management practices applied by ISPs.[173] As set out in Section 4, these transparency measures aim to facilitate effective choice by consumers, and thus support the objective of safeguarding an open internet. For example, they ensure a consumer has the right information to effectively choose an ISP that allows them to access the CAPs of their choice.
- Article 5(1) of the Regulation places a duty on Ofcom to promote the continued availability of non-discriminatory internet access services at levels of quality that reflect advances in technology.[174]

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[171] Article 3(3), third subparagraph and Recital 15 of the Regulation. Article 3(3) third subparagraph describes traffic management practices that are prohibited, unless under this specific exception, which include: no blocking; no slowing down; no alteration; no restriction; no interference with; no degradation; and no discrimination of traffic.

[172] As discussed below, BEREC Guidelines also set out that "*Any throttling action should be limited to the section of the network where congestion occurs, if feasible*", para 91.

[173] Article 4(1) and Article 4(1) (a) of the Regulation.

[174] Article 5(1) of the Regulation. Article 5 also grants Ofcom powers to "*impose requirements concerning technical characteristics, minimum quality of service requirements and other appropriate and necessary measures on one or more providers of electronic communications to the public, including providers of internet access services*". To date, we have not yet exercised these powers.

Enforcement of the net neutrality framework on traffic management to date

6.9   We have a duty to monitor and ensure compliance with the Regulation. In line with this, we conducted an enforcement programme into ISPs' traffic management practices from December 2017 to May 2019. This led to formal enforcement actions being initiated against three mobile operators (Three, Vodafone and O2) in 2018.[175]

6.10   At the end of the formal enforcement programme, we published our Framework document outlining our approach to assessing compliance with the Regulation, including the rules on traffic management. That guidance sets out our current traffic management framework, which largely draws on the 'reasonable' and 'exceptional' traffic management provisions set out in the Regulation.[176]

6.11   There have been no formal investigations since the end of this enforcement programme. However, we continue to monitor compliance and regularly publish our findings in the annual report.

Review of the net neutrality framework on traffic management

6.12   In this section we consider the outcomes delivered by the net neutrality framework on traffic management, which encompasses both the rules on traffic management and the accompanying guidance, and assess how those outcomes align with our regulatory objectives.[177]

6.13   As set out above, the traffic management framework plays an important role in safeguarding the open internet and internet-based innovation. At the same time, that framework can have an impact on the efficient build, management, and use of networks across the internet value chain as:

- it places direct constraints on how ISPs build and manage their networks; and
- it can lead to an indirect impact, by affecting the incentives of ISPs, CAPs and other players across the wider value chain to build, manage, and use networks efficiently.

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[175] The summary of these cases can be found in the Framework document, pp.17-19.

[176] The Framework document, p.17.

[177] BT Group suggested better traffic management could generate environmental gains through reduced electricity consumption (see BT Group Response to the 2021 Call for Evidence response, paragraph 18). A system-wide view is required to understand the net impacts of data traffic levels on electricity use and related carbon emissions. Although increased traffic might increase the electricity used by network equipment, digital communications can help to avoid emissions from other sources (e.g. video meetings instead of commuting by car). We also expect network equipment to become more energy efficient (e.g. see The Carbon Trust's *Carbon impact of video streaming report*), which could offset the impact of greater data traffic. Different traffic management solutions can increase or decrease system-wide electricity use. Moving caches and data centres closer to the consumer might improve performance and reduce the electricity needed for transmission, but this infrastructure also requires power. The environmental impact also depends on the extent to which network operators use low carbon energy sources or offset their emissions, which some operators are working towards doing.

Has the current traffic management framework delivered good outcomes?

The framework on traffic management has safeguarded an open internet

6.14   As set out in Section 4, the framework on traffic management seeks to prevent behaviour by ISPs which might hinder the open internet. The risk of such behaviour could be significant in the absence of any regulations, considering the gatekeeper position that ISPs hold and their limited incentives to be transparent to consumers about how they distribute content.

6.15   Since the Regulation came into force in 2016, our monitoring programme has identified only a handful of instances of potentially harmful behaviour. Where it was necessary, we have engaged with stakeholders, taken swift enforcement action requiring ISPs to cease harmful actions as appropriate and thus safeguarded the open internet.

6.16   We recognise there is a degree of uncertainty on the nature and extent of traffic management practices that would have occurred in the absence of the existing net neutrality rules. However, we are aware of a number of historical traffic management practices that would not be permitted under the current rules. Examples in the UK included the throttling or blocking of peer-to-peer file sharing, VoIP services such as Skype, and BBC iPlayer in the late 2000s.[178, 179] This might suggest that absent regulation, there could be some possibility of traffic management practices emerging which would not be permitted by the current rules and potentially could risk undermining an open internet.

ISP investment has generally met the increasing demands on networks, but this could change in the future

6.17   As set out in Section 2, in addition to our duties to enforce the net neutrality rules and ensure continued availability of non-discriminatory internet access services, we also have a duty to further the interests of citizens and consumers, where appropriate by promoting competition, encouraging investment and innovation, and the availability and use of high-speed data transfer services throughout the UK.

6.18   We have a number of policy interventions designed to promote, to the greatest extent possible, network-based competition among ISPs, and we consider that our approach has worked well in driving investment, and facilitating our objective to safeguard well-run, efficient and robust networks.[180]

6.19   Where ISPs compete effectively to ensure they deliver a good quality of experience to their customers, they should have appropriate incentives to make investments to meet

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[178] See Ofcom, 2011. *Ofcom's approach to net neutrality*, and Marsden C.T., 2017. *Network neutrality: From policy to law to regulation*.

[179] A 2012 publication also documented that a significant number of European ISPs were placing restrictions on peer-to-peer traffic, VoIP or giving preferential treatment to specific types of over-the-top traffic. BEREC, 2012. *A view of traffic management and other practices resulting in restrictions to the open Internet in Europe: Findings from BEREC's and the European Commission's joint investigation*.

[180] See for example *WFTMR 2021-26*, Volume 1 paragraphs 2.24-2.28 and Ofcom, 2022. *Ofcom's future approach to mobile markets: a discussion paper*, paras 4.11 to 4.16; 4.55 to 4.59, and 4.73.

expected traffic demands, by planning their capacity upgrades to ensure they can carry all their expected traffic at the busy hour and deliver the quality of service that their customers subscribe to.

6.20   Furthermore, the interconnected nature of the internet value chain means that ISPs are incentivised to work closely together with other players across the value chain. In particular, this might mean working with CAPs for traffic and network planning purposes, particularly where any anticipated traffic events might result in congestion and have a material impact on the quality of experience of their respective customers.[181] This should in principle reduce the risk of congestion on networks, and mean that traffic management is less likely to be necessary to mitigate the consequences of such events.

6.21   As set out in Section 3 at paragraphs 3.38 and 3.39, consumers have seen improvements in terms of access to 5G and full fibre networks, in part due to investment by ISPs. Furthermore, residential and business customers can choose from a wide range of ISPs' products which differ by price, broadband speeds, data or calls allowance, and services and devices included in the package. The vast majority of customers appear to be satisfied with the overall service received.[182]

6.22   As discussed in Annex 8 at paragraphs A8.24 and A8.28, ISPs have been making significant investments in their networks, and in doing so, have taken into account expected peak usage. This means that the highest peaks in demand appear to have had a limited adverse impact on ISPs' network performance. While some ISPs noted to us that they do not explicitly monitor the impact of traffic peaks on their networks, some (albeit limited) evidence suggests that congestion on networks does not generally appear to be a significant issue at present.

6.23   However, as discussed below, some stakeholders argued that going forward, traffic management will need to play a greater role in meeting the demands on networks. In light of those views, we have considered some distinct areas of traffic management where more flexibility and clarity in the rules might be needed to ensure that networks are run in an efficient and robust manner and are generally fit to meet citizens and consumers' needs in the future, namely:

- traffic management to enable retail offers with different quality standards; and
- traffic management measures to deal with congestion.

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[181] As we discuss below, the largest CAPs tend to discuss upcoming traffic events and the required network planning with ISPs, in order to ensure good user experience for their customers. We accept that in principle the incentives to do so might vary across CAPs e.g. if they offer time- or quality-insensitive services. However, we have not seen evidence suggesting that CAPs, particularly those that could place significant burden on networks and materially impact quality of experience, have refused to engage with the ISPs for network planning purposes.

[182] See Annex 9 for more detail.

Traffic management to enable retail offers with different quality standards

Application of the net neutrality framework

6.24   As set out in Section 2, the commercial agreements between ISPs and end-users, including
         their retail customers, are generally governed by Article 3(2) of the Regulation which sets
         out that the agreements can specify technical conditions and characteristics of the internet
         access service, provided this does not limit the exercise of the rights of end users laid down
         in Article 3(1).[183] The BEREC Guidelines explain that end-users' rights are likely to be
         unaffected where technical conditions and characteristics of an agreement, including
         different levels for quality of service parameters other than data volumes and speeds, are
         applied in a transparent and application-agnostic way (whereby the treatment of traffic is
         independent of the content and services the traffic is associated with).[184]

6.25   Where ISPs offer various retail packages with different levels of quality, they may need to
         apply traffic management measures to their network to differentiate between the internet
         traffic of different retail packages. Specifically, when ISPs' networks become congested,
         the traffic associated with the higher quality packages may need to be prioritised over the
         traffic for lower quality packages. When applying such prioritisation measures, ISPs should
         have regard to the principles underlying exceptional traffic management measures
         necessary to prevent impending network congestion and mitigate the effects of
         exceptional or temporary network congestion, pursuant to sub-paragraph (c) of Article 3(3)
         of the Regulation. This includes a requirement that equivalent categories of traffic are
         treated equally.

6.26   Furthermore, retail offers with different levels of quality would need to be implemented in
         a way that is also compliant with Article 4(1), which in addition to transparency measures,
         indicates that the quality of service provided needs to meet the conditions agreed in the
         contract.

Stakeholder views

6.27   In their responses to the 2021 Call for Evidence, a number of ISPs argued that customers
         will increasingly require solutions tailored to meet specific broadband needs.[185]

6.28   ISPs argued that they should be able to differentiate their services to better meet those
         different needs, by offering different quality of service tiers at different price points (for
         example, a higher price for lower latency or jitter). However, because packages offering
         different quality of service would require some traffic prioritisation where there is network

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[183] Article 3(2) of the Regulation.
[184] BEREC Guidelines, paras 34, 34a.-d.
[185] See for example, BT Group response to the 2021 Call for Evidence, p. 10-11; Three response to the 2021 Call for
Evidence, p.14; VMO2 response to the 2021 Call for Evidence, p. 9.; Vodafone response to the 2021 Call for Evidence, p. 3,
11.

congestion, some ISPs either thought that the net neutrality rules did not permit such differentiation, or they were unclear whether it was permitted.[186]

6.29   Vodafone made further arguments that the net neutrality framework which prevents service differentiation on quality is discriminatory against "*users who wish to pay for enhanced service to get a better experience (e.g. for gaming)*" and users "*for whom a lower quality of service and price are acceptable (e.g. email only users)*".[187]

Should the current framework be updated with respect to retail offers with different quality standards?

6.30   The current net neutrality framework permits certain retail offers with different quality standards (other than speeds), where the same quality of internet access service on each individual package applies to all content and services accessed.

6.31   As set out above, ISPs offer a range of packages differentiated on the basis of various dimensions such as price, speeds, or data allowance. However, we are not aware of UK ISPs currently offering any retail packages with different quality parameters such as on latency, jitter, or packet loss.[188]

6.32   As recognised in Section 3 paragraphs 3.50 to 3.54, there is some uncertainty around future take-up of new use cases that are supported by wider technological developments such as 5G roll out and edge computing (e.g. immersive gaming, metaverse applications and various smart business solutions). However, we generally accept the argument that going forward, developments in user needs, technology and the services ISPs can deliver, might lead to demand for retail offers which provide different levels of quality.

6.33   We would also expect the take up of such services to depend on their pricing and customer willingness to pay. Research suggests that most customers remain price sensitive and have shown a low willingness to pay for service upgrades such as higher speeds, but that there are some who would be prepared to pay a substantial premium for gigabit-capable services.[189] Willingness to pay for higher quality services may be higher among businesses rather than residential customers.[190]

6.34   In this context, as we explain below, retail offers differentiated on the basis of quality can benefit consumers and help achieve our regulatory objectives. Therefore, we would be concerned if such beneficial retail differentiation is prevented because the net neutrality framework is too restrictive, perceived to be too restrictive, or if ISPs were unclear on what retail offers are permitted.

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[186] Ofcom meeting with [✂] on [✂] and [✂] on [✂]. See also our discussion of the introduction of services affected by the net neutrality framework in Section 8.

[187] Vodafone response to the 2021 Call for Evidence, p.16-17.

[188] We note that certain premium quality 5G packages have been launched in the US, by Verizon and T-Mobile, https://www.verizon.com/plans/unlimited/ and https://www.t-mobile.com/cell-phone-plan.

[189] Ofcom, 2021. *WFTMR 2021-26*, Volume 2: market analysis, paras 2.66-2.76.

[190] Research suggests some small businesses consider reliability and service to be more important than cost when deciding whether to stay or switch provider, Ofcom, 2022. SME Communications research: qualitative summary report.

<u>The framework should support beneficial retail offers which could better meet diverse needs and support our objectives</u>

6.35   Where retail broadband markets are competitive, ISPs have incentives to develop offers to attract customers with varied needs, which can improve the choices available to those customers. For example, if ISPs were to offer basic quality 5G packages at a lower price, it could provide a more affordable choice to the most price sensitive and financially vulnerable customer groups and encourage greater take-up of 5G services.[191] It may also enable ISPs to offer higher quality offers to a subset of customers that are willing to pay a premium for it.

6.36   Take-up of innovative ISP services catering to different customer needs might also have a positive impact on innovation in content and services markets. For example, it could encourage CAPs to develop innovative solutions designed around different broadband quality levels. This could therefore have a positive impact on open internet-based innovation.[192]

6.37   Retail competition on quality parameters, and the prospect of attracting a particular group of customers who value quality and are willing to pay a premium for it, is a key driver for ISPs to invest in their networks to improve quality of experience. Existing offer differentiation in retail broadband markets on various parameters such as speed or technology has benefited consumers and driven investment in faster, more reliable and more capable networks to date.[193] Going forward, differentiation and competition on quality might be particularly important for 5G network roll out, where we expect some customers to increasingly want to rely on quality-sensitive mobile uses and devices (such as augmented or virtual reality uses on-the-go, and wearable or industrial IoT devices, for both residential and business customers).[194]

6.38   Furthermore, different quality tiers at different price points might encourage customers to explicitly consider what quality of experience they want, particularly when networks become congested, and what price they are willing to pay for it.[195] Some customers may opt to pay a premium for a consistently higher quality of experience, whereas others might prefer to pay a lower price, if they use time- or quality-sensitive content and services less frequently or can shift some of their quality-sensitive usage to off peak hours. The latter impact might also effectively reduce network usage at peak hours and so lower network costs over the long term.[196]

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[191] Research indicates that some customers would downgrade to a slower service in response to increases in price differentials between their existing package and a slower speed package. Ofcom, 2021. *WFTMR*, Volume 2: market analysis, para 2.77.

[192] As with specialised services, the availability of retail offers with different quality standards and the impact on CAPs' offerings could in turn support innovation and productivity enhancements in the wider economy.

[193] Ofcom, 2021. *WFTMR*, Volume 1, paragraphs 2.20 – 2.28; Ofcom, 2022. *Ofcom's future approach to mobile markets: a discussion paper,* paras 4.46-4.48.

[194] Ofcom, 2022. *Ofcom's future approach to mobile markets: a discussion paper*, paras 5.4-5.15.

[195] In a competitive environment, price differences should be largely reflective of the costs associated with the provision of different levels of quality.

[196] Current retail pricing practices are not based on peak-usage and thus they do not encourage customers to take these considerations into account.

Our proposed approach to retail offers with different levels of quality

6.39   The net neutrality rules permit retail packages which offer different levels of quality such as latency, jitter, and packet loss, where the quality of internet access service on each individual package is independent of the CAPs accessed.

6.40   We therefore propose clarifications through guidance on the permissible retail offers and traffic management needed to implement them, which we consider would provide ISPs with more clarity and flexibility. There is some risk that this further flexibility could adversely impact outcomes to consumers. Therefore, our proposals include conditions to mitigate these risks and ensure that our objectives are met in a proportionate way.

6.41   Annex 5 sets out the associated guidance for our proposals.

Clarifying when retail offers with different levels of quality are permitted

6.42   We propose to clarify our approach to these services with guidance setting out that, subject to the considerations discussed below regarding transparency and services meeting the contracted level of quality of service:

- Retail offers which provide different levels of quality of service for different ISP subscriptions are permitted. These are offers where the same quality applies to all the content and services accessed by a given subscriber.
- Retail offers which provide multiple quality of service levels within a single subscription are also permitted if the level of quality of service is independent of the content and services accessed. These include, for example, offers in which a customer can subscribe to an add-on to (temporarily) boost their quality of service or vary the contracted quality of service across the day.

6.43   We also propose to clarify that where an ISP needs to apply traffic management on its network to deliver the level of quality of service under the different retail offers contracted, they are permitted to do so. The need for such measures should only arise where there is already congestion on the networks or where the risk of congestion is imminent (see paragraphs 6.93 and 6.94).

Additional conditions to ensure consumers are sufficiently protected

6.44   As set out in Section 4, safeguarding the open internet requires ensuring that consumers can access the right information and appropriately engage with it when choosing their broadband provider. Without additional conditions requiring transparency, limited information or a lack of effective consumer engagement could create a risk that consumers make poor decisions[197] as:

- Consumers generally tend to be less informed and engaged with information on quality of network performance than on price.

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[197] Such as, paying for premium quality services that they do not benefit from or not signing up to premium quality packages when such outcome would be beneficial.

- Consumers might be less familiar with certain technical parameters of quality, such as jitter, latency, packet loss, and might not fully understand how these parameters might affect their user experience.
- Quality of experience might also depend on the specific mix of content and services that are used or accessed, which can vary over time and across different customers. For example, low jitter might improve quality of experience when using video-conferencing applications such as Teams but might not impact web browsing or sending emails.

6.45   This could also have the effect of undermining the competitive pressures on ISPs to ensure a good quality of experience for their customers and would run counter to the objective of safeguarding an open internet.

6.46   To mitigate these risks, we propose that these packages can only be offered where sufficient transparency is provided so customers are able to understand what they will receive with these packages.

6.47   Specifically, these offers will need to comply with the transparency measures set out in Article 4 of the Regulation, which include requirements on ISPs to ensure that all their customers can understand what is offered under different packages and how this might affect customer quality of experience.[198] This could include both contracted performance standards on elements such latency, jitter or packet loss and information that allows customers to form meaningful expectations about standards of quality and what this means in terms of their expected experience.

6.48   The introduction of different quality of service tiers could have an associated risk of discrepancies between actual and contracted quality of service. There is a risk that customers on lower quality tiers will not get outcomes consistent with their preferences, if they are not able to effectively engage and assess what quality of service their ISP is contracted to deliver, and how this compares with what they actually get.[199]

6.49   However, the requirements set out in Article 4 of the Regulation, should sufficiently guard against these risks. ISPs would be required to ensure that customers can take effective action where there are significant, continuous or regularly occurring discrepancies between the actual performance and what has been agreed in the contract, including:

- provide a clear and comprehensible explanation of the remedies available to the consumer which can be used in the event of any significant or regularly recurring discrepancy;[200] and
- put in place transparent, simple and efficient procedures to address the complaints of end-users.[201]

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[198] As set out in more detail in Annex 5, in demonstrating compliance with Article 4 of the Regulation, ISPs can take account of the existing BEREC Guidelines in relation to the transparency measures on quality of service parameters.
[199] These customers might also be less actively engaged with their choice, e.g. if they can simply remain on their existing package without an active decision or consideration whether they get what they need and what they pay for.
[200] Article 4(1)(e) of the Regulation.
[201] Article 4(2) of the Regulation.

6.50   In addition, improved regulatory monitoring and reporting discussed below should also help customers to identify whether there is non-conformity of performance of the services they subscribe to.

Our approach to monitoring and reporting on retail offers with different levels of quality as well as the general quality of internet access services

6.51   Where an ISP launches a retail offer that provides a different level of quality of service (other than speeds), we will closely monitor their compliance with the Regulation.[202]

6.52   In light of the risks discussed above, as well as the risks associated with our other proposals discussed below and in Section 8 on specialised services, we also propose to expand our approach to the information we monitor and report on in our monitoring report.

6.53   Where an ISP launches a retail offer that provides a different level of quality of service (other than speeds), ISPs would need to routinely collect and store information to provide to Ofcom, including:

- information demonstrating that the different levels of quality of service through different retail offers apply independently of the content and services accessed;
- information demonstrating compliance with the requirements regarding transparency and services meeting the contracted level of quality of service set out in Article 4 of the Regulation; and
- information in relation to traffic management whenever it is applied, discussed in more detail below at paragraphs 6.102 to 6.104.

6.54   In light of the potential concerns that customers on lower quality tiers might not effectively engage with their choice (or remedies available), we will pay particular attention to monitoring any discrepancies between the actual and contracted levels of quality for these customers.

6.55   Also, in light of our duty to promote the continued availability of non-discriminatory internet access services at levels of quality that reflect advances in technology,[203] we propose to periodically gather information on network performance, including traffic throughput, latency, jitter and packet loss and other measures of congestion.

6.56   Should we identify a number of recurring violations of the net neutrality rules or concerns on the general quality of the internet, we may consider the need for further measures, including requirements on ISPs to maintain a minimum level of quality.

6.57   We also propose to regularly report certain aggregate information on the metrics of network performance, traffic management applied, its compliance with the net neutrality rules and the impact on quality of services, to facilitate further transparency of consumer choice.

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[202] As per our duties to monitor internet access service performance set out in Article 4(4), and broader duties on supervision and enforcement set out in Article (5) of the Regulation.
[203] Article 5(1) of the Regulation.

Retail offers providing different quality levels for traffic associated with specific content & services

6.58   Offering retail packages which provide a particular level of quality for the traffic associated with specific content and services (for example, a retail offer which would provide lower jitter for a particular video-conferencing application) is not permitted under the current net neutrality framework. This is because the implementation of such offers would require ISPs to prioritise specific traffic during congestion (such as prioritising traffic for that particular video conferencing application, over any other traffic) and so would infringe Article 3(3) of the Regulation.

6.59   We consider that it may be beneficial to permit some content- and services-specific retail offers with different levels of quality. As set out in paragraphs 6.34 to 6.37, such retail offer differentiation can support a number of positive outcomes to customers and is consistent with the objectives of our review, of safeguarding the open internet, open internet-based innovation and well-run, efficient and robust networks.

6.60   However, we also recognise that there may be risks with allowing these offers that could lead, without mitigating measures, to competition distortions and to the restriction of consumers' choice in the long run:

- Concerns could arise from the ISPs' gatekeeper position which may give ISPs a degree of market power over CAPs and an ability to distort competition in CAPs markets.
- There is also a risk that certain larger CAPs might enjoy sufficient bargaining power to negotiate more favourable terms from ISPs. For example, a large CAP may agree with an ISP that a higher quality internet access service apply exclusively to their content and services which could put other CAPs, excluded from a higher quality offer, at a competitive disadvantage. Such an advantage could distort competition, and adversely affect the incentives of other competing CAPs to enter markets and/or innovate new services, hindering our objectives of safeguarding the open internet and open internet-based innovation.[204]

6.61   We consider these risks could be managed through case-by-case monitoring and enforcement, consistent with our proposed approach towards zero-rating practices, set out in Section 5. Specifically, such assessments would place particular weight on the following considerations:

- That these risks are likely only where an ISP and / or a CAP enjoy a degree of market power and use it to undermine the open internet and open internet-based innovation (e.g. either by directly restricting choice or by distorting competition).
- The ability to exclude or otherwise undermine competition from rival CAPs will also depend on the extent to which it is essential for those CAPs to be part of the premium quality offers to successfully compete. For example, the competitiveness of some CAPs might be more dependent on quality (e.g. live streaming, AR/VR gaming

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[204] In principle, such CAP specific offers might also be used to distort competition in ISPs' markets, for example, if a must-have CAP entered into an exclusive agreement which meant that other ISPs would not be able to serve that content at a higher quality. In practice, however, it is unclear how such exclusivity arrangement could be implemented (e.g. how other ISPs would be prevented from offering that content at a higher quality, if they wished so).

providers) than other CAPs (e.g. providers of some social media apps, general web browsing, mail, e-commerce solutions, etc). In addition, where quality matters for competition, harmful impacts are more likely where there are significant barriers to achieving the competitive level of quality via alternative means (e.g. if CAPs need to incur significant upfront costs to guarantee the needed level of quality via their own CDNs or on-net caching, these options might be limited to sufficiently large CAPs).

- There may be greater scope for concern if an ISP requires CAPs to sponsor the higher quality scheme i.e., pay a fee to ISPs if they want to be included in higher quality retail packages, although harm would not necessarily occur in all circumstances. The issues in this regard are similar to those which may arise in the general circumstances where ISPs are allowed to charge CAPs, which we discuss later in this document (in Section 7, at paragraph 7.59).

6.62   Overall, we consider there are benefits to such an approach, provided the appropriate mitigating measures are put in place to address any potential concerns discussed above. However, as ISPs prioritising one CAP's traffic over another is prohibited by the net neutrality rules, it would require a change to legislation which would be a matter for Government and Parliament. We welcome stakeholders' views on the potential benefits and risks associated with this approach.

Traffic management measures to deal with congestion

Application of the net neutrality framework

6.63   As explained at paragraph 6.6, the current net neutrality rules permit ISPs to apply certain measures which can go beyond 'reasonable' traffic management, in certain specific circumstances. This includes circumstances when it is necessary to prevent impending network congestion and mitigate the effects of exceptional or temporary network congestion, provided that equivalent categories of traffic are treated equally.

6.64   Furthermore, where ISPs apply traffic management in the above circumstances, they need to be compliant with the requirements in relation to transparency and meeting contracted levels of quality laid down in Article 4 of the Regulation.

Stakeholder views

6.65   In their responses to the 2021 Call for Evidence, some ISPs[205] expressed views that the current net neutrality framework is not fit to deal with exceptional traffic peaks and their impact on ISPs' networks. They suggested:

- The difference in capacity needs between usual busy-hour traffic and exceptional traffic peaks will increase over time.[206]

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[205] BCG response to 2021 Call for Evidence, p.3; BT response to 2021 Call for Evidence, p.4; ISPA response to 2021 Call for Evidence, p.3; Three response to 2021 Call for Evidence, p.11-12; Vodafone, response to 2021 Call for Evidence, p.10; VMO2 response to 2021 Call for Evidence, p.9-10.
[206] [✂] suggested that the 'peak to mean ratio' would increase from [✂] to [✂] on the 100% adoption of IPTV. [✂].

- ISPs' ability to manage traffic in these events is very limited under the current framework, because they are unable to identify similar traffic categories (as required by the rules) and they do not have a clear view of what traffic management practices are permitted.[207]
- The current net neutrality framework limits incentives for CAPs to consider their impact on networks and coordinate the planning of these events with ISPs.
- This forces ISPs to deal with exceptional traffic peaks through capacity expansion, and leads to potentially inefficient network investment.[208]
- It can lead to a greater incidence of congestion as the demands on networks continue to increase.[209]

6.66   To better understand these concerns, we have obtained further information from ISPs, set out in our assessment below as well as Annex 8, in relation to:

- top traffic peaks and their impact on network performance, including congestion; and
- traffic management measures applied to deal with imminent or occurring congestion, and any barriers to applying such measures as a result of the net neutrality rules.

Should the current framework be updated with respect to when traffic management is allowed to deal with congestion?

6.67   As set out below, while exceptional traffic peaks (i.e. a traffic peak where the overall demand on networks materially exceeds the usual network load in the busy hour) are often associated with popular content which consumers value, they may also lead to undesirable outcomes such as congestion, even where there are appropriate competitive pressures and incentives to invest in networks to meet capacity demands.

6.68   In this context, we consider the role that the traffic management framework should play in addressing congestion, in a way which supports our objectives, irrespective of the reasons congestion may arise (e.g. lack of investment in networks or CAPs using networks inefficiently). We discuss ISPs' incentives to invest in their networks above (at paragraphs 6.18 to 6.21), and CAPs' incentives to invest in their own networks and use ISPs' networks efficiently in Section 7 (at paragraphs 7.24 to 7.39).

Highest traffic peaks appear to have had limited impact on congestion on networks but congestion could arise in the future

6.69   We asked ISPs to provide data on their top 10 traffic peaks during each year from 2019 to 2021.[210] That data suggests that the absolute size of those top traffic peaks is getting larger from year to year, at a rate of about 26% per year since 2019 for fixed ISPs and about 33%

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[207] BT Group response to 2021 Call for Evidence, p.4
[208] This was raised by [✂] in a meeting with Ofcom on 21 June 2022.
[209] For example, Three suggested it "has been investing heavily in its network as part of its £2 billion expansion programme. However, this will not be enough to avoid congestion in the busiest parts of the network during the busiest hours." Three response to 2021 Call for Evidence, p.12.
[210] The top 10 peaks are determined by measuring the maximum traffic throughput (measured in bits per second) during periods of peak demand.

for mobile ISPs.[211] In particular, top traffic peaks increased significantly during the covid pandemic in 2020 and has continued to rise in 2021. This is broadly consistent with the growth in overall traffic, which has increased by over a third per year since 2019. It is also consistent with the growth in the average busy hour throughput which has increased by over a quarter per year over the same time period.

6.70   The highest peaks appear to be about 10-40% higher than the average traffic during the normal busy hour at that time of year for fixed ISPs.[212]
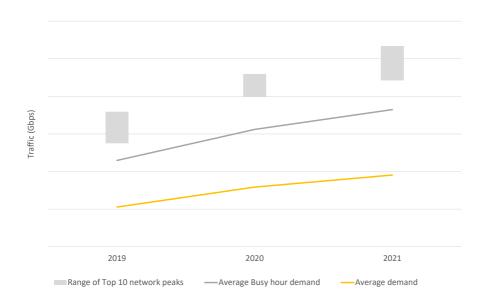
Figure 6.1: Peak traffic growth for a selected fixed ISP [✂]²¹³

6.71   As outlined in Annex 8 (at paragraphs A8.24 to A8.28), top traffic peaks do not appear to have resulted in significant congestion to date. However, the data we have on these peaks cover overall traffic on the network, and we recognise there may also be more localised peaks, that affect particular parts of a network. These localised peaks may be particularly relevant for mobile networks.

6.72   Furthermore, as the overall demands on networks increase, we acknowledge that there is a potential risk that congestion might become more problematic going forward. For example, congestion might become more prevalent where the demand on networks becomes 'peakier'. This is because meeting very accentuated peaks in demand with significant additional capacity investment might not be economically viable, if that capacity is then not used outside of those peaks.

6.73   While traffic data trends during the period from 2013 to 2021 suggest fairly stable growth rates of overall demand,[214] there is a lot of uncertainty with regard to how peak demand

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[211] See Figure A8.4 in Annex 8.
[212] [✂]. This data is not available for mobile networks.
[213] Peak data shown is from the ISP's Core network.
[214] See for example Figure A8.1 and Figure A8.2 in Annex 8.

may develop in future, as it depends on future use of networks, how quickly consumers adopt new use cases[215] and the extent to which new services are used at peak times.[216]

6.74 More generally, the inherent uncertainty around the popularity of certain new online content implies there is always a risk that an exceptional traffic event leads to congestion. For example, ISPs might not be able to fully anticipate exceptional traffic peaks when planning their network upgrades.[217]

6.75 In addition, as ISPs' networks largely carry traffic generated by other players such as CAPs or CDNs, the accuracy of traffic forecasts will depend on the extent to which different players work together to identify the key peaks in demand and whether they may lead to particular bottlenecks in the networks. While to date there appears to be some coordination between ISPs, CDNs and CAPs where it is needed, some ISPs indicated they are unsure whether voluntary coordination will continue to work going forwards.[218] Furthermore, even if coordination between ISPs, CDNs and CAPs takes place, this might not be sufficient to avoid congestion as CAPs themselves might not be able to accurately forecast the traffic demand arising from their content.[219]

<u>The framework should enable ISPs to apply traffic management to prevent or mitigate the impact of congestion</u>

6.76 Irrespective of the reasons why congestion may arise, where it does arise on certain links, it may undermine the functioning of large segments of a network or in more extreme cases, an entire network. For instance, during congestion, particular nodes or links in the network could become so overloaded that they fail. While traffic may be able to be re-routed via alternate routes, the effect of such failures can cascade, reducing the available capacity at the point where the networks need it most. Furthermore, congestion will inherently have greater adverse impact on traffic that is time or quality sensitive.

6.77 As such, during periods of congestion or where there is an imminent risk of it, traffic management (e.g. throttling traffic on congested links) can be an important tool to mitigate the above adverse effects and maintain the integrity of the network, and the availability and quality of services to customers.

6.78 Furthermore, where traffic management such as throttling can be used to address congestion, it can strengthen CAPs' incentives to seek to deliver their traffic in a way that

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[215] E.g., IP delivery of live TV, or gaming applications requiring significant amounts of data traffic.

[216] We consider most stakeholder views on future demand over the next 5-10 years is relatively speculative.

[217] Based on the evidence from our formal information gathering, the timing of peaks (e.g., sporting final, new Netflix release, new game release) is easier to predict than their magnitude, as the latter may depend on more unpredictable factors, like which sporting teams get to a final or the publicity around new streaming or game releases. For example, the release of a new series of The Crown on Netflix caused a top 10 peak for an ISP, [✂], in 2020.

[218] BT Group response to 2021 Call for Evidence, p.3,4.

[219] A number of reports in July 2022 outlined the impact of congestion on Netflix's own content distribution network from the release of the final episodes of Stranger Things 4. This implies that CAPs may not always have a good idea of potential demand arising from content releases. For example, https://www.digitalspy.com/tv/ustv/a40487901/stranger-things-season-4-volume-2-netflix-crash/.

avoids the busy parts of the network if possible,[220] reducing the risk of congestion and the need for capacity upgrades in those parts of the network over time.

6.79   However, the information obtained from ISPs suggests they do not generally engage in significant amounts of active traffic management to manage the peaks described above. The ISPs stated that this is largely because they are unable to identify similar traffic categories (as required by the rules), particularly if traffic is encrypted, and they do not have a clear and certain view of what traffic management practices are permitted.[221]

6.80   Some ISPs[222] have processes in place that allow throttling of all traffic in specific circumstances and on specific parts of the network. However, these ISPs said that they have not needed to implement traffic management over the period from January 2021 to January 2022. For example, Vodafone outlined how it sometimes manages capacity for fixed wireless access (FWA) customers to ensure mobile customers are able to obtain a minimum level of service in times of network stress.[223]

6.81   Other ISPs do not appear to have traffic management measures in place and instead rely on ensuring appropriate capacity for forecast demand.[224] As discussed below, while such an approach can reduce the risk of congestion on networks, it can also result in inefficient network investment.

Inability to use traffic management to address congestion under the current framework may increase the risk of exceptional traffic peaks driving inefficient network costs

6.82   In light of our objective to safeguard well-run, efficient and robust networks, we seek to encourage appropriate investment in network capacity. However, it is also important that such investment is efficient, as this will ultimately affect prices to retail customers.

6.83   Where congestion is largely addressed by dimensioning the network to carry traffic at exceptional peaks, this can lead to inefficient network capacity upgrades, particularly where there are alternative options to ensure demand is met (i.e. where the one-off peak can be reduced with traffic management measures by throttling or blocking certain traffic in a way that does not have an undue impact on customer quality of experience). Where additional capacity is added to the network but is not used outside of a limited number of instances, there could also be a risk that the additional benefit to customers is less than the upfront and operating costs of the upgrade.[225]

6.84   Given the current context where traffic volumes are continuously growing, this reduces the cost of inefficient network investment, because the usual network load in the busy hour

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[220] We recognise that smaller CAPs and ISPs which more heavily rely on transit or third party CDN services might have limited ability to adjust their traffic delivery routes / models.

[221] [✂].

[222] [✂].

[223] Vodafone response dated 6 May 2022 to the RFI dated 17 March 2022, page 4.

[224] [✂]

[225] While ISPs may consider not to commit investment in networks which is not profitable, as noted in this section, some ISPs argued that they are forced to make such uneconomical network upgrades under the current net neutrality framework. We understand this is related to the provision in the Regulation which states that "Recurrent and more long-lasting network congestion which is neither exceptional nor temporary should not benefit from that exception but should rather be tackled through expansion of network capacity." Recital 15 of the Regulation.

tends to soon reach previous peak traffic levels (which means ISPs tend to bring their network investment forward rather than making investment that would not be required at all). For example, if peak demand is approximately 40% higher than average busy hour traffic,[226] and traffic is growing annually at around 40%,[227] then any investments needed to meet a traffic peak are likely to be needed in any case to meet average busy hour demand the following year.

6.85   However, we also acknowledge that there is uncertainty as to how exceptional traffic peaks might evolve in the future and the impact that this may have on network planning and investment. In this uncertain context, there is a risk that ISPs may more systematically opt for over-dimensioning their networks because they consider they cannot apply any traffic management to mitigate congestion under the current net neutrality framework,[228] the costs of which are likely to be passed onto consumers. We consider such an outcome would not align with our objective of safeguarding well-run, efficient and robust networks.

<u>Inability to use traffic management to address congestion under the current framework could also undermine network resilience</u>

6.86   The information from ISPs has suggested that some ISPs [✂] have used the capacity reserved for network resilience[229] to deal with traffic peaks. [230]

6.87   Resilience capacity serves to ensure that networks can deal with technical failures, network security threats or other events which are not related to peaks in demand. Where that capacity is used to deal with exceptional traffic peaks, to avoid congestion in the network, it makes the networks more vulnerable to technical or security threats. If those threats materialise, this can lead to substantial harm to consumers, particularly in periods where networks are already busy.

6.88   Ensuring networks remain resilient is a strategic priority for Ofcom.[231] As such, a cautious approach is required when using resilience-related capacity to deal with exceptional traffic peaks. While it is up to ISPs to decide how they use this capacity to handle exceptional traffic peaks, we would be concerned if the current framework materially limits how ISPs can respond to congestion in the short term through traffic management measures so that the use of resilience capacity is the only measure they apply, as it could lead to the network being susceptible to significant congestion in the event of network failures.

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[226] See paragraph 6.69.

[227] Annex 8, A8.6.

[228] ISPs may have particular difficulty in forecasting traffic from exceptional peaks in sufficient time to expand network capacity. For example, they may not know the specific dates or fixtures of football matches to be livestreamed, or their importance, and thus likely audience, or whether these clash with major gaming releases until a few weeks before the event. This may lead to them over-dimensioning the network in order to have greater confidence of being able to deliver traffic during these peaks.

[229] Resilience is broadly the measures that Communication Providers (CPs) and Operators should take to identify, reduce, prevent, and remedy events that impact "availability, performance or functionality" of their networks and services

[230] Ofcom meeting with [✂].

[231] Ofcom, 2022. *Statement: Ofcom's plan of work 2022/23*, paragraph 3.2.

Our proposed approach in respect to traffic management to deal with congestion

6.89   We expect ISPs to continue to plan their networks to meet forecast demand, so that they are able to carry all traffic in most circumstances and ensure appropriate resilience of their networks. Where ISPs do not plan sufficient capacity to meet demand in most circumstances, we do not consider widespread use of traffic management is an appropriate approach. However, considering the underlying uncertainty around the demand on networks, and how the profile of that demand might evolve in the future, we accept that there is a credible risk that congestion might occur even with appropriate investment in networks.

6.90   The current framework already allows for certain traffic management measures to prevent or mitigate congestion. However, we are concerned that the current framework, and particularly the perceived lack of clarity in it, could constrain ISPs' ability to apply such traffic management and would consider this inconsistent with our objectives of safeguarding the open internet and well-run, efficient and robust networks.

6.91   Therefore, we propose clarifications on the permissible traffic management actions, which we consider would provide ISPs with more flexibility to appropriately manage traffic. We consider further flexibility in traffic management can be beneficial if it expands the options available to ISPs to deal with congestion, helps reduce its impact on user quality of experience, lowers network costs in the long run, and thus improves outcomes related to our objectives.

6.92   In principle, there may be a small risk that this further flexibility could adversely impact ISPs' customers' quality of experience or conflict with our open internet objectives. We discuss this below and our proposals include measures to mitigate these risks so that our objectives are met in a proportionate way, while enabling the benefits of this approach.

Clarifying that non-discriminatory, proportionate and transparent traffic management, targeted at the affected parts of the network, is permitted

6.93   We propose guidance to clarify that ISPs are permitted to apply non-discriminatory traffic management to prevent impending congestion, and / or mitigate the effects of congestion. This is consistent with the current rules setting out that any traffic management applied in the above circumstances should treat equivalent traffic categories the same. Annex 5 sets out the associated guidance for this proposal.

6.94   We propose to set out in our guidance that we are unlikely to consider the following traffic management as discriminatory:

- Throttling all traffic to the same extent.
- Prioritising all the traffic for a set of ISP retail customers, in order to ensure the contracted levels of quality of internet access service are met. As discussed above, if ISPs use traffic management to enable retail offers with different quality standards, prioritising traffic for one set of customers should not result in the service provided to other customers not meeting the minimum quality offered as part of their service.

- Applying traffic management which ensures that equivalent categories[232] are treated equally, where ISPs are able to identify equivalent categories of traffic across their networks.[233]

6.95   The proposed guidance also clarifies that, if possible, such traffic management should be targeted at the affected parts of their network, i.e. the parts of the network which are congested or where congestion is imminent, including the circumstances where it is (or expected to be) triggered by an exceptional peak in traffic. Specifically, we propose that differential treatment of traffic in the affected parts of the network and the rest of the network (e.g. throttling all traffic in the affected parts of the network to the same extent, while applying no active traffic management in the rest of the network) would not be considered a discriminatory traffic management practice. For clarity, where congestion is isolated to traffic on a dedicated link from a single CAP, action can be localised to this.

6.96   We also propose to clarify, that under the current rules, for each internet access service offered by an ISP, it should not treat specific content or services differently to other content of a similar category within the affected part of the network.[234] However, we discuss this further below.

<u>Additional conditions to ensure consumers and the open internet are sufficiently protected</u>

6.97   In principle, there is a risk that the flexibility in traffic management set out above is used by ISPs in a way that could adversely impact customers' quality of experience or conflict with our open internet objectives. We would be particularly concerned with traffic management that is applied consistently or for a prolonged period, to areas of the network that are not / no longer congested.[235]

6.98   To counter this risk, ISPs will need to ensure that traffic management applied in the above circumstances is proportionate, i.e. the extent of traffic management necessary to address the congestion, and reflective of the severity of that concern.[236]

6.99   In order to provide further clarity to ISPs on how they can comply with this proportionality requirement, we propose to set out in guidance how to determine whether a particular part of the network (i.e. any specific link, node or combination of them) is affected and hence where traffic management as described above can be applied. Specifically:

- We would consider that part of the network is congested where the underlying network or network component (such as a link or node) is offered a greater traffic load than it can deliver within the design parameters set by the network operator. The parameters set by the network operator may include some or all of: maximum

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[232] Similar categories of traffic should be understood as traffic with similar technical characteristics, for example in terms of bandwidth, latency, jitter or packet loss requirements.
[233] Although we understand that currently ISPs have limited ability to identify traffic categories consistently, where there is some traffic across a given link or connection which an ISP cannot categorise, then the ISP would need to treat all traffic from that link or connection equivalently.
[234] However, in Section 9 we discuss exceptions such as emergency services.
[235] This could for example suggest that an ISP is using its gatekeeper position and targeting traffic management at certain CAPs.
[236] As per Article 3(3) third subparagraph of the Regulation.

latency, maximum jitter, maximum packet loss, utilisation. In general, latency, jitter, packet loss may be measured over the whole network, part of the network or on an individual network component. Utilisation in general relates to each network component; or

- We would consider that a part of the network is at imminent risk of congestion, where:

  - an ISP identifies a scheduled traffic event, including an exceptional peak in traffic, which is expected to increase traffic load to the point where congestion is likely, based on the parameters above; or
  - the ISP has not identified a scheduled event, but traffic is above the normally expected level to an extent that if traffic remained this far above the normal level, or continued to increase, congestion would be expected to occur.

6.100   ISPs would also need to ensure that the degree of traffic management reflects the severity of congestion and should aim to bring traffic load close to the maximum design parameters set by the network operator.

6.101   Additionally, ISPs will need to ensure that they are transparent about the traffic management practices they apply, to enable their customers to make informed and effective choices according to Article 4 of the Regulation, and the relevant BEREC Guidelines. [237]

6.102   ISPs will also need to ensure their practices comply with the requirements in relation to meeting contracted levels of quality, laid down in Article 4 of the Regulation. As set out above, we do not intend to revisit the Article 4 requirements in this review.

Expanding our approach to monitoring and reporting on network performance, traffic management and any impact on service quality

6.103   In light of Ofcom's supervision and enforcement duties set out in Article 5 of the Regulation, and to help ensure traffic management practices do not impinge on our objectives, we propose that ISPs will need to routinely collect and store information to provide to Ofcom for each instance where they have applied traffic management to demonstrate that the traffic management approach taken was compliant with the Regulation. That information should cover:

- Which parts of the network were affected, for how long, and how this satisfied the criteria, set out in paragraph 6.98.
- What information was used to determine that congestion was imminent and / or occurring.
- The dates/times when traffic management was enacted on their network (including where traffic management is permanently configured on the network).
- The specific traffic management measures that were applied in which part of the network, and the reasons why (e.g. to address congestion; to ensure the contracted quality of service standards are met), and how these measures satisfied the non-

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[237] See for example, paragraphs 135-136 of the BEREC Guidelines.

discrimination, proportionality and transparency criteria, set out in paragraphs 6.93 to 6.101.

6.104 As noted above, we also propose to regularly report certain aggregate information on the metrics of network performance, traffic management applied, its compliance with the net neutrality rules and the impact on quality of services, to facilitate further transparency.

6.105 Annex 5 sets out the guidance in relation to proposed monitoring and reporting in relation to traffic management.

A more focused approach to traffic management to address congestion

6.106 Currently, ISPs cannot identify traffic of similar categories consistently and so can only meet the requirement set out in Article 3(3) (c) of the Regulation, that they treat *equivalent categories of traffic* equally, if they treat *all traffic* the same in affected areas of the network.

6.107 Traffic management that treats equivalent categories of traffic *differently* is currently not allowed. Therefore, ISPs are not able to target their traffic management measures on less time- or quality-sensitive traffic or traffic generating congestion.

6.108 If ISPs were able to identify certain types of traffic, we consider further flexibility to apply traffic management at a more focused level could be beneficial and consistent with our objective to ensure well-run, efficient and robust networks. A more focused approach to dealing with congestion might ensure that scarce network capacity resources are used in a way that positively impacts consumer quality of experience or in times of congestion prevents or mitigates the harmful impacts on consumers. For example, it may be beneficial to permit ISPs to target their traffic management measures on less time- or quality-sensitive traffic (e.g. traffic which can tolerate a degree of delay or packet loss), or traffic which might be less valuable to consumers (e.g. background traffic which does not affect the core functionality of content or services), in order to free up capacity in the affected parts of the network to deliver content which is more time- or quality- sensitive (e.g. live, real-time content or bi-directional communication services), and to improve overall consumer quality of experience.

6.109 In principle, there may be some risk that ISPs use any additional flexibility in a way that has the impact of undermining the open internet and open internet-based innovation (e.g. where ISPs explicitly throttle certain CAPs). However, that risk might be limited, given that the flexibility to apply a more granular traffic management approach would only apply during congestion or where there is an impending risk of it.

6.110 Furthermore, we consider that in principle, such a risk could be materially mitigated with appropriate proportionality and transparency requirements as well as appropriate monitoring and enforcement (e.g. where ISPs would need to demonstrate that more granular traffic management measures were necessary to mitigate the adverse impact on the customers in the affected parts of the network and can objectively justify any indirectly discriminatory treatment of traffic).

6.111   Overall, we consider there are benefits to allowing a more focused approach to address congestion, provided the appropriate mitigating measures are put in place to address any potential concerns discussed above. However, this approach would require a change to legislation which would be a matter for Government and Parliament. We welcome stakeholders' views on the potential benefits and risks associated with this approach.

Consultation questions

Our proposals in relation to retail offers

Question 5: Do you agree with our assessment of retail offers with different quality levels and our proposed approach?

Question 6: Do you agree with the approach in our guidance in Annex 5 in relation to differentiated retail offers, including transparency requirements, improved regulatory monitoring and reporting of retail offers with different quality levels as well as the general quality of the internet access services?

Question 7: What are your views on a more permissive approach towards retail offers where different quality levels are content and service specific?

Our proposals in relation to traffic management to deal with congestion

Question 8: Do you agree with our assessment of how traffic management can be used to address congestion and our proposed approach?

Question 9: Do you agree with the approach in our guidance in Annex 5 in relation to the use of traffic management to address congestion, including transparency requirements, improved regulatory monitoring and reporting of general network performance metrics, the use of traffic management and the impact on service quality?

Question 10: What are your views on a more focused approach to traffic management to address congestion?

Please provide any further evidence you have to support your responses.

7. Charging

Introduction

7.1   This section considers the issue of enabling ISPs to charge CAPs for carrying or prioritising general internet access traffic. This issue has specifically been raised with us in the context of this review and therefore we respond to the points made. However, whether or not a charging regime should be introduced in the UK is a decision for Government and Parliament.

7.2   We focus on the arguments for and against allowing ISPs to charge fees to CAPs, in the context of the current net neutrality framework, which ISPs have argued leads to significant challenges for them in ensuring the efficient build and operation of their networks. We do not consider whether charging would be an appropriate measure to achieve broader public policy objectives, such as coverage targets.

7.3   We first set out the relevant background to our assessment, including the UK regulatory framework, how the charging issue has been approached by different jurisdictions outside of the UK and the arguments raised by stakeholders. We then consider whether ISPs charging CAPs would support the objectives of this review.

7.4   Finally, we set out our position that:

- While we acknowledge that in principle there could be benefits to a charging regime, introducing such a regime would be a significant step and we have not seen sufficient evidence that such an approach would support our objectives at this time.
- Our other proposals provide flexibility that would help mitigate several issues identified by ISPs.

Background

7.5   In this section, we consider charging broadly to include circumstances where a CAP pays an ISP for delivering its traffic to the customers on the ISP's network, which could include providing some preferential treatment of traffic, such as prioritisation, as part of an internet access service. Such a charge could be levied on a lump sum, per customer, or per unit of traffic basis, and could be applicable at all times or in specific circumstances such as a traffic peak. It could also be targeted at all CAPs or a subset of them.

Regulatory framework

7.6   Under the current net neutrality framework, there is no express prohibition on ISPs charging CAPs for carrying their traffic as part of an internet access service.[238] Nonetheless, ISPs are effectively unable to impose charges on CAPs since there is no legal or regulatory obligation on CAPs to negotiate with ISPs and, in practical terms, CAPs do not need to

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[238] The current net neutrality framework does permit ISPs to charge CAPs for the provision of specialised services.

engage with ISPs for their traffic to be carried.[239] It is the operation of Articles 3(1) and 3(3) of the Regulation that effectively limits the ability of ISPs to credibly require CAPs to pay them by giving end-users the right to access information and content of their choice while preventing ISPs from blocking, degrading or prioritising access to an individual CAP's content in a discriminatory way or on the basis of commercial considerations.[240] [241]

International experience

7.7   The question of whether CAPs should contribute to ISPs' network costs for the use of their networks is a topical policy issue in several jurisdictions. A number of stakeholders have suggested to us that this international debate could be relevant to our review of the net neutrality framework.[242]

7.8   We are aware of relatively few international examples of CAPs being charged fees. In the examples we could find of monetary transfers from CAPs to ISPs, these generally arise where a regulatory regime explicitly enables or mandates such charging or contribution to costs of investment, rather than simply in the absence of (or liberal interpretation of) net neutrality rules. We set out some examples of regimes which allow or require contributions in some form from CAPs to ISPs below (more detail can be found in Annex 7).

7.9   In South Korea, where we understand it is commonplace for CAPs and ISPs to privately negotiate bilateral commercial contracts relating to network access, there is currently a legal dispute between Netflix and a local ISP, SK Broadband. SK Broadband requested that Netflix bear the cost of the international leased line service that was built exclusively to serve Netflix traffic, and subsequently requested negotiation arbitration from the Korea Communications Commission (KCC) in November 2019 when Netflix did not agree. In response, Netflix filed a lawsuit against SK Broadband in April 2020. Netflix's case against bearing the cost of the international leased line service was dismissed in a District Court judgment in June 2021. The Court found that because Netflix's traffic was carried on a separate international submarine line, Netflix was receiving economic value from the exclusive leased line connection and so it had an obligation to bear the cost of using it.[243]

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[239] Moreover, the scope of the net neutrality rules is limited to ISPs and does not place any obligations on CAPs.

[240] Article 3(1) says "end-users shall have the right to access and distribute information and content, use and provide applications and services, irrespective of […]the information, content, application or service, via their internet access service." Article 3(3) allows reasonable traffic management but states it "shall not be based on commercial considerations but on objectively different technical quality of service requirements of specific categories of traffic" and the specific criteria for exceptional traffic management similarly do not include commercial considerations.

[241] As discussed in section 2, the UK-EU Trade and Cooperation Agreement also has a relevant section on internet access services. Article 178 of the UK-EU Trade and Cooperation Agreement commits the UK to "ensure that, subject to its laws and regulations, suppliers of internet access services enable users of those services to access and distribute information and content, use and provide applications and services of their choice, subject to non-discriminatory, reasonable, transparent and proportionate network management". Similar text also appears in other international trade agreements involving the UK.

[242] See for example, BT Group response to the 2021 Call for Evidence, p. 7; Vodafone response to the 2021 Call for Evidence, pp. 20-21.

[243] The Court stated that "it needs to be determined by negotiations between the parties involved whether or not some fees will be paid". Tech Crunch, 2021. *Korean court sides against Netflix, opening door for streaming bandwidth fees from ISPs* [accessed 14 October 2022].

7.10   In Italy, the national regulatory authority AGCOM required DAZN, which broadcasts football matches over the internet, to provide large ISPs with equipment to be integrated into the ISPs' networks to handle a substantial share of the overall DAZN-originated live streaming data traffic.[244] The aim was to avoid network congestion resulting from traffic peaks and a degradation of quality of service for all internet customers. AGCOM's reasoning was based on preserving network integrity and protecting consumers. AGCOM did not refer to the net neutrality rules in making this order.

7.11   In Singapore, ISPs cannot participate in discriminatory practices, or impose restrictions, charges or other measures which would render any legitimate Internet content effectively inaccessible or unusable. However, ISPs are allowed to manage internet traffic based on commercial considerations as long as minimum quality of service standards are fulfilled, legitimate internet content is not blocked, and ISPs continue to comply with the regulator's competition and interconnection rules. We are not aware of any instances of ISPs charging CAPs fees related to the management of their traffic.

7.12   We note that there is a live international debate, within the EU and the US, about whether CAPs should make a contribution to support network roll-out or upgrades.

- The European Commission has indicated that it will launch a consultation in Q1 2023 that will examine whether, and if so how, large digital platforms should contribute to the costs of Europe's telecoms networks.[245] BEREC recently published its preliminary assessment of the underlying assumptions of payments from large CAPs to ISPs in the form of a 'direct compensation' mechanism. It stated that it had found "no evidence that such a mechanism is justified given the current state of the market".[246] BEREC is expected to publish its final report in December 2023.
- In the US, where there is currently no net neutrality framework at the federal level,[247] a recent FCC report discussed the prospect of requiring 'edge providers' (e.g. video streaming providers, digital advertising firms, and cloud services companies) to contribute to the Universal Service Fund for the roll-out of broadband networks.[248]

7.13   While these policy debates provide important context for our work, they raise public policy issues that are broader than those raised by the net neutrality framework considered in this review, and which would be a matter for government.

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[244] AGCOM, 2021. *Delibera 206-21-CONS - Atto di indirizzo per il corretto dimensionamento e la dislocazione geografica della rete di distribuzione (CDN) delle partite di calcio di serie A per le stagioni 2021-2024 in live streaming*.

[245] Reuters, 2022. *EU to consult on making Big Tech contribute to telco network costs* [accessed 14 October 2022].

[246] BEREC, 2022. *BEREC preliminary assessment of the underlying assumptions of payments from large CAPs to ISPs*.

[247] A net neutrality regime was introduced in 2010 before being challenged in the courts and later repealed. A July 2021 Executive Order encouraged the Federal Communications Commission (FCC) to "restore net neutrality rules". The White House, July 2021. *FACT SHEET: Executive Order on Promoting Competition in the American Economy.*

[248] Federal Communications Commission, 2022. *Report on the Future of the Universal Service Fund.*

Our analysis of stakeholder arguments

Stakeholder views

7.14   Some ISPs, including BT,[249] Vodafone[250] and Three,[251] have argued that they should be allowed to charge CAPs for delivering or prioritising traffic across their networks. They consider the current net neutrality rules prohibit charging arrangements between an ISP and a CAP, and so lead to a number of related concerns:

- reduced incentives for CAPs to make efficient use of networks, increasing ISPs' networks costs;
- ISPs recovering higher costs from their retail customers via higher retail prices; and
- reduced ability to recover future investment costs required to meet expected traffic growth and consequent reduction in ISPs' incentives to invest or offer innovative services.

7.15   In response to our 2021 Call for Evidence, an ISP, [✂], provided an illustrative example suggesting approximately 20% of traffic was potentially delivered inefficiently on its fixed network on 16 December 2020.[252] It considered this could be improved using a combination of: changing the timing of game updates to move traffic to less busy times; using more efficient traffic distribution (assuming that peering is more efficient than transit, and caching is more efficient than peering); and using multicasting for live broadcasting.

7.16   In our subsequent stakeholder engagement, the same ISP [✂] suggested that some CAPs deliver live TV traffic inefficiently because a significant proportion (c.50%) has been proposed to be delivered using peering links. [✂].[253]

7.17   In contrast, a number of CAPs, including Sky, which is also an ISP,[254] expressed concerns about a regime that would permit charging. They argued that because of the ISPs' gatekeeper position, such a regime could:

- permit ISPs to engage in discriminatory behaviour which might be particularly harmful to smaller or non-commercial CAPs and could limit the funds available for investment and innovation in content and services;
- entrench or widen the gap between smaller CAPs and the largest online companies who could use their market position to gain competitive advantages (e.g. negotiate lower fees from ISPs); and

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[249] BT Group response to 2021 Call for Evidence, p.4-6.
[250] Vodafone response to 2021 Call for Evidence, p.10 and 17.
[251] Three response to 2021 Call for Evidence, p.13.
[252] [✂].
[253] Ofcom meeting with [✂].
[254] See for example, BBC response to 2021 Call for Evidence, p. 3, 9-10; Channel 4 response to 2021 Call for Evidence, p. 3; Google response to 2021 Call for Evidence, p. 5-7; Netflix response to 2021 Call for Evidence, p. 7-8; Sky response to 2021 Call for Evidence, p. 7.

- encourage ISPs to increase scarcity in network capacity to increase the prices they could charge CAPs for carrying traffic.

Review of relevant information

7.18 To better understand these concerns, we have considered further evidence from ISPs and CAPs, in relation to:

- the magnitude of network costs that vary with the level of traffic;
- the extent to which CAPs can affect the costs and efficiency of ISPs' networks; and
- potentially adverse impacts of the above on ISPs' network investment.

7.19 We separately consider ISPs' arguments that the current net neutrality regime can increase retail prices paid by consumers, within our broader assessment of a charging regime further below.

The magnitude of network costs that vary with the level of traffic

7.20 Annex 8 (specifically paragraphs A8.29 to A8.36) sets out that for fixed ISPs, the backhaul and core network are the parts of the network that contain the most traffic-sensitive costs.[255] The information obtained from the ISPs suggest that these backhaul and core network costs are likely to make up about 10-15% of a typical domestic consumer's bill, amounting to approximately £60 a year per user. For mobile networks, we consider all of the network costs, including the access network, are affected by a mobile ISP's peak traffic. Annex 8, paragraph A8.35, sets out that the average costs of mobile networks are likely to be around £40 per user per year.

7.21 We consider that for both fixed (backhaul and core) and mobile networks, a certain percentage of these costs will be invariant to the level of traffic at peak times, as there will need to be a minimum level of investment and operating expenditure for the network to exist even with a very small level of traffic.

7.22 We asked stakeholders to provide information to assess the percentage of costs that they consider would vary with the level of peak traffic. We received some data on this with differences between the ISPs that responded. However, as set out in Annex 8 (paragraphs A8.32 and A8.35), the information we have suggests that 50-75% of both backhaul and core fixed network costs and mobile network costs are likely to be dependent on the level of traffic at peak times. Using this estimate, these peak traffic-dependent costs would represent approximately £30-45 per fixed customer per year and approximately £20-30 per mobile customer per year.

7.23 ISPs also provided information that shows the majority of the traffic on their networks comes from a relatively small number of large CAPs. As set out in paragraph 3.45, the data

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[255] We consider access network costs to be relatively independent of traffic in the short to medium term (see paragraph A.8.31), although in the long term, there might need to be further investment in access networks.

indicates that a large portion of busy hour traffic (in the region of 50%) on fixed ISPs is driven by five large CAPs, specifically, Amazon, Facebook, Google, Netflix and Sky.

The extent to which CAPs can affect the costs and efficiency of ISPs' networks

7.24   Some ISPs have argued that large CAPs should contribute to network costs, as they are causing these costs to be incurred and, under a charging regime, would be incentivised to reduce them.[256] We understand that this argument relates to two potential justifications for a charging regime:

- First, where a CAP's action is causing network costs to be incurred by an ISP, a charging regime might be better aligned with the principle of cost causality, provided such charges can ensure that the costs are recovered from those whose actions are causing the costs to be incurred. We accept that this is a relevant principle to consider as cost-reflective prices can enable markets to work efficiently, allocating resources to the services which consumers value most.

- Second, there are various externalities present in the use of ISPs' networks. For example, one retail customer's use of the network at peak can increase the risk of reduced network performance and worsen quality of experience for other customers of the network. The way in which the CAP chooses to deliver that traffic at peak can have the same impact. The implication of these externalities is that they can lead to inefficiencies if CAPs and/or ISPs' retail customers take insufficient account of these adverse impacts. Such inefficiencies can therefore provide a potential justification for a charging regime, if such a regime can provide greater incentives for CAPs to minimise the impact they have on ISPs' network costs.

7.25   The strength of the above arguments depends on whether and to what extent a CAP can affect the costs an ISP incurs and hence, the efficiency of ISP's network. In principle, we understand a CAP can affect costs and efficiency by:

- determining and / or influencing the timing of when traffic is generated (e.g. if timing of traffic increases traffic peaks, it can force an ISP to increase its network capacity to ensure such traffic can be delivered; shifting more non-time-sensitive content use to off-peak hours can also reduce ISP's network costs and improve its efficiency); and / or

- deciding on how their traffic is delivered and where traffic is handed over to the retail ISPs' network (e.g. storing cached content in the ISP's network closer to the retail customer can improve efficiency where it reduces the need for additional capacity in the ISP network).

7.26   Below we consider the evidence on the extent that the actions by CAPs can affect the costs of ISPs' networks and inefficiencies arising under the current regime.

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[256] BT Group response to 2021 Call for Evidence, p.6-7, Vodafone response to 2021 Call for Evidence, p.10, KCOM response to 2021 Call for Evidence, p. 6-8.

Determining the timing of traffic

7.27   As traffic-sensitive network costs will be determined by the levels of traffic at peak times, the timing of when traffic is generated can affect the magnitude of that peak, and in turn, can affect the associated network costs and the efficiency of ISPs' networks. This raises the question of who determines when traffic is generated.[257]

7.28   As discussed in Section 3, in general, traffic on the internet is initiated by a request from the ISP's retail customer. The data is then delivered back by the CAP in response to this request. The timing of traffic flows is therefore generally determined by the ISPs' retail customers who request to access content and services at a chosen time.

7.29   CAPs are more likely to directly determine the timing of certain traffic flows that can be sent in the background and without a request from a customer, such as gaming downloads and software updates. For example, the information obtained from ISPs suggested that gaming updates have contributed to some traffic peaks in the past. However, there is also some evidence that gaming companies have increased the degree to which they shift updates and enable download of new titles to off peak hours since 2020.[258] This could have been due to several factors, including cooperation between CAPs and ISPs[259] or unilateral action by CAPs seeking to reduce charges from CDNs to deliver updates or more generally improve their customers' quality of experience.[260]

7.30   As CAPs have limited ability to directly determine the timing of traffic, we now consider a broader question whether and to what extent CAPs may be able to indirectly influence the timing of their customers' requests to access content and services (e.g. through pricing).

7.31   We note that currently retail customers are generally not encouraged to time-shift their use of online content and services because they do not face fees (or changes in quality of service levels) that are peak-based. Some CAPs[261] indicated that customers are strongly opposed to restrictions around when they can access content and services, so the potential ability of CAPs to influence the timing of this traffic without losing customers is uncertain. This however may result in some degree of inefficient network use, particularly at peak hours, where certain customers would be willing to shift their use of content and services to off-peak times if they had a price incentive to do so. The same inefficiencies may arise because ISPs' retail pricing is also not peak based.[262]

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[257] We note that this question has been debated in other policy contexts, e.g. in the discussion of whether large CAPs should make 'fair share' contributions towards network costs in the EU. See BEREC, 2022. *BEREC preliminary assessment of the underlying assumptions of payments from large CAPs to ISPs* (BoR (22) 137).

[258] [✂].

[259] This could be due to bilateral discussions between the parties. There was also wider industry cooperation during the pandemic that could have encouraged these behaviours.

[260] Although updates can be released early in the morning, the actual timing of the update will depend on whether the gaming company pre-sends the update prior to a customer's request (with the downside that some updates may be unnecessary) or waits for a customer's request, which may be later and in a peak period.[260] Gaming downloads can only be pre-sent in certain circumstances such as the console being online and having sufficient storage capacity available.

[261] [✂].

[262] Retail broadband offers with different quality levels could have a similar impact on customer usage decisions as peak-based pricing (i.e. with these offers, customers are effectively paying a premium for a better quality of experience during

7.32   CAPs' ability to influence timing of traffic might be very limited with regards to live events. As set out at paragraph A8.15 of Annex 8, ISPs identified sporting events as a significant source of traffic contributing to the network load for 87% of the top 10 peaks experienced on ISPs networks over the period 2019-2021, for which a specific driver was identified.[263] In this context, the timing of the event is generally determined by event organisers.

7.33   Overall, the above evidence suggests that the extent to which CAPs determine the timing of traffic, and hence cause the peaks in traffic and the associated ISPs' network costs, is limited. It is also unclear whether CAPs can encourage further time-shifting of traffic flows to improve efficiency, without significantly undermining their customers' quality of experience.

Choosing an efficient delivery approach

7.34   Even where the timing of traffic is generally decided by the ISP's retail customer, a CAP can in principle affect how and where that traffic is delivered to the retail ISP's network. That CAP's choice can therefore also influence ISP's network costs and their efficiency.

7.35   The evidence set out in Annex 8 at paragraphs A8.37 to A8.48 shows that CAPs, and particularly large CAPs, can and do take actions to reduce certain costs on ISPs' networks by using services or making investments which tend to improve the efficiency of traffic delivery. In our discussions with CAPs, they suggest they are generally incentivised to help support network efficiency, because they want to ensure their customers experience a good quality of service. The individual incentive to do so, particularly for the larger CAPs, may therefore mitigate some of the externality concerns highlighted above.

7.36   Potential decisions and investments made by CAPs that can affect customers' quality of experience, the ISPs' network costs and the efficiency of traffic delivery include:

- CAPs can influence where traffic is handed over to the retail ISPs' network. The evidence suggests that CAPs already use or invest in CDNs to handover traffic closer to the user which tends to reduce the traffic, including the traffic at peak times, that needs to be delivered through ISPs' core networks.[264]
- CAPs can invest in the development of technology solutions (e.g. video encoding, adaptive bit rate delivery) which help to reduce the traffic volume required to deliver their content.[265]

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network congestion which can often occur during peaks). While they are permitted by the net neutrality rules subject to the relevant requirements discussed above, they are not yet marketed.

[263] As part of our request for information we asked ISPs for the type of traffic category driving each of the 10 highest peaks they experienced in each year over the period 2019-2021.

[264] [✂]. In its response to the 2021 Call for Evidence, Netflix referenced a study by BT from 2018 which estimated that "having content deeper in the network offloads 60% of core capacity, achieving significant unit cost reductions over time" (p.5).

[265] Netflix, BBC and ITV all mention investment in video encoding technologies. In its response to the 2021 Call for Evidence, Motion Pictures Association noted that "Netflix has invested in codec technology to optimise bandwidth use. Between 2015 and 2020 this halved the number of bits needed to carry a film/series of the same quality", p,2.

7.37   Furthermore, information obtained from CAPs suggested that they face a number of barriers, that are not within their control, to further improving the efficiency of their approach to traffic delivery. Some of these barriers identified by CAPs include:

- some potentially more efficient technological options (e.g., multicasting) are not yet practical or technologically feasible for CAPs at all, or in relation to some ISPs;[266]
- a lack of physical space in suitable ISP network exchanges to install caches or lack of agreement from ISPs allowing any installation of caches in their buildings means more efficient delivery methods may not be available; and
- limited options to use CDNs when specific features are required (e.g. geoblocking).[267]

7.38   We also note the long tail of small CAPs will often rely on transit as they do not have the scale or sufficient traffic volumes to make other options (such as private peering or caching) commercially viable. In addition, larger CAPs may choose to use transit for resilience purposes.[268]

7.39   Overall, our view is that at least the largest CAPs, which account for a significant share of traffic, are already making decisions and investments that tend to improve the efficiency of traffic delivery. In principle, under a charging regime, CAPs could have stronger incentives to improve the efficiency of how their traffic is delivered over ISP networks. However, we consider that the scope for CAPs to be able to make further efficiency improvements is unclear, particularly in light of the presence of the various barriers discussed above.

Network cost recovery and impact on future investment

7.40   We have not seen evidence from ISPs that persuades us that the current net neutrality regime leads to a reduced ability to recover future investment costs required to meet expected traffic growth, as they claim.

7.41   In general, we consider that competition across both fixed and mobile networks will be an important driver of investment as discussed in Section 6 at paragraph 6.18.[269] In a competitive market we would expect that where ISPs provide services that users want, these ISPs should be able to charge prices to customers to cover their costs.

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[266] Multicast technology relies on the ability to control the network end to end from the server on which the content is stored all the way through to the customer device. In the case where IPTV is provided by the ISP, they can manage this end-to-end connection on their own set top boxes. However, this is not necessarily the case for over-the-top provision such as livestreaming by Amazon Prime and other CAPs. Similarly, multicast may not be practical where the customer uses a different device, such as a tablet rather than a set top box. More generally, multicast technology is not currently available for scale deployment across multiple ISPs.

[267] An ISP, [✂], outlined how some CAPs, when delivering specific content for which it only has UK and not worldwide rights, are required to have geoblocking technology to prevent the content being accessed from outside the UK. Not all CDN providers can support this technology and so the choice and ability to use CDNs becomes more limited. Meeting with [✂] on 21 June 2022.

[268] We also note that some smaller ISPs will also need to rely on transit to a greater extent than larger ISPs. This will limit some of the efficiency gains from CAPs' investment in the use of CDNs.

[269] Broader macroeconomic factors, such as interest rates, will also have an impact on future investment.

7.42   Furthermore, while the evidence does not allow us to establish how the net neutrality regime might impact ISPs' future investment,[270,271] the evidence does not appear to suggest there are significant concerns with future investment overall, at least for the next few years. [272]

- As outlined in Annex 8 in Figure A8.8, [✂], most major fixed ISPs are forecasting a similar level of nominal expenditure over the period 2022-2026 compared to the period 2017-2022. Figure A8.9 suggests that mobile networks are forecasting relatively consistent levels of investment, although with some increase in operating expenditure.
- One ISP [✂] suggested to us that there will be an 'investment gap' due to a significant [✂] increase in demand by 2030.[273] We note that such an increase in demand has been seen previously without increasing costs due to decreasing unit costs of equipment.[274] [✂], however we are not aware of specific evidence on why that would be the case.
- Current forecasts for capital expenditure provided by ISPs in response to our formal information request indicate that ISPs are still planning to invest in their networks and therefore would expect to see a return on those investments.

7.43   We accept that there are several significant uncertainties in relation to the scale of future investment. While the scale of investment required will increase as demands on networks grow, the rate and the profile of the increase is uncertain. The cost of future investment will depend on those trends in demand but also the trends in unit costs of carrying data. Historically, unit cost decreases have enabled ISP networks to keep broadly consistent levels of expenditure over time despite significant increases in overall traffic demand.[275] We expect unit costs will continue to decrease, but we accept that the level and the rate of further reductions is uncertain.

7.44   Furthermore, we accept there are significant uncertainties around the returns of future investment. However, we generally expect that future network investment in higher capacity or innovative network services can enable ISPs to increase overall revenues by providing a higher quality or a more diverse range of services (for example, by selling premium services like high quality home broadband or 5G enterprise services).

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[270] For example it is unclear whether the ability to charge CAPs in addition to their retail customers, would help ISPs to recover their future investment costs, in part because such a charging regime could also result in lower retail broadband prices (discussed in more detail below).

[271] We are aware of some academic empirical evidence suggesting that net neutrality rules can exert a negative effect on network investments and other outcomes, although the scale of the impacts found and methodologies create some uncertainty about the probative value of these results (e.g. Briglauer W, Cambini C, Gugler K, & Stocker V, 2021, *Net Neutrality and High-Speed Broadband Networks: Evidence from OECD Countries)*.

[272] We have previously concluded that at an industry level, financial performance of mobile ISPs appears to be supportive of investment, although it varies among MNOs. Ofcom, 2022. *Ofcom's future approach to mobile markets: a discussion paper*, p.58.

[273] Ofcom meeting with [✂] on 21 June 2022.

[274] Unit costs here refer to costs of equipment per unit of traffic.

[275] Information requested by Ofcom from ISPs over the period 2017-2022 illustrates relatively flat expenditure over the period 2017-2022 for the industry as a whole.

Would ISPs charging CAPs for carrying or prioritising traffic support our objectives?

There could be improved outcomes in relation to well-run, efficient and robust networks but we have no strong evidence so far on the extent of any such improvements

7.45   In principle, we accept that the current net neutrality framework could potentially undermine our objective to safeguard well-run, efficient and robust networks, if it encouraged CAPs to use ISPs' networks inefficiently. However, we consider that to date, stakeholders, and particularly, ISPs have not provided sufficient evidence to suggest that these concerns are borne out in the current regime to any significant extent.

7.46   First, we accept the argument that CAPs, in principle, have an impact on ISPs' network costs, and that they may have stronger incentives to make efficient decisions if the impact of their decisions were reflected in the charges they face. However, as discussed above, the largest CAPs already appear to be making investments and taking decisions that improve the efficiency of delivering traffic on ISPs' networks, as they seek to improve the quality of experience for their customers. In addition, whereas inefficient use of networks has been raised by ISPs, there are also indications that this might be driven by CAPs' inability to access more efficient traffic delivery means (e.g. a more extensive use of CDNs or appropriate multicasting technology and infrastructure), as opposed to a lack of incentive or willingness to do so.

7.47   Overall, stakeholders were able to provide only limited evidence on the current inefficiencies in network use or how they might evolve going forward. It is therefore unclear whether there is the opportunity for significant efficiency improvements to result from a charging regime.

7.48   In addition, while ISPs raised various claims that the current rules might undermine their ability to recover network costs, and that a charging regime could positively impact future investment, we have not seen specific evidence of this.

7.49   We also consider that our other proposals in this review are expected to have a positive impact on ISPs' ability to recover costs. These proposals provide scope for ISPs to innovate new services, manage their networks more efficiently, and, potentially, achieve some cost savings as well as generate new revenue streams:

- Our proposals would create scope for ISPs to use traffic management to prevent or mitigate congestion, and should further strengthen CAPs' incentives to use their networks efficiently. That is, where ISPs can manage traffic in areas affected by congestion, it may lead to observable differences in quality of experience for a CAP's customers, depending on how that CAP decides to handover traffic to the ISP. This could encourage CAPs to seek to deliver traffic more efficiently (e.g. avoiding parts of

the network that are likely to be busy) and/or to discuss with ISPs how to better manage traffic.[276]

- We also note that some of the inefficiencies of network use might arise because of retail customer behaviour, as discussed above. Our proposals on retail offer differentiation on quality might allow ISPs to offer packages that encourage their retail customers to more explicitly consider what quality of experience they want where networks become congested, and what price they are willing to pay for it. Some customers may opt to pay a premium for a higher quality of experience, whereas others might prefer to pay a lower price, if they use time- or quality-sensitive content and applications less frequently or can shift some of their quality-sensitive usage to off peak hours. The latter impact might effectively reduce network usage at peak hours and so lower network costs over the long term. In addition, ISPs are also free to explore other pricing structures (e.g. peak-based charges) to induce more efficient network use on the retail side.

- Furthermore, our proposals provide greater certainty about how the net neutrality framework should be interpreted in relation to specialised services, as discussed in Section 8. This would make it easier for ISPs to deploy innovative new services and generate new revenue sources. This would also help ISPs to provide specialised services in a manner that uses network resources efficiently and with lower network costs.

There could be lower prices for retail broadband but increased CAP subscription prices; overall it is unclear if this would significantly improve consumer outcomes

7.50 Overall, we consider there is potentially some merit in the argument that, if ISPs were able to charge CAPs, this could result in lower prices for retail broadband services.

7.51 First of all, if a charging mechanism encouraged CAPs to use ISPs' networks more efficiently, and this resulted in lower network costs, at least some of these cost reductions would be passed through to retail broadband customers in lower prices. The magnitude of any downward adjustment to retail broadband prices caused by these effects, at least to an extent, would depend on the scope for efficiency improvements. As discussed above, based on the evidence seen so far, it is unclear whether this would be significant.

7.52 Secondly, in addition to the efficiency impacts, a charging regime would also lead to transfers between CAPs, ISPs and consumers, which could result in:

- potentially lower retail prices for broadband (because if ISPs were able to generate additional revenue from certain CAPs, this would increase ISPs' incentives to compete by offering lower prices for retail broadband customers that access those CAPs); and
- potentially higher prices for CAP subscriptions (because CAPs would face higher costs of delivering traffic to their customers and may pass some of the cost increases through to their retail prices).

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[276] We recognise that smaller CAPs and ISPs which more heavily rely on transit or third party CDN services might have limited ability to adjust their traffic delivery routes / models.

7.53   The scale and nature of these effects is uncertain and the overall impact on prices to consumers of introducing charging will depend on a number of factors:[277]

- the intensity of competition in retail broadband markets (the higher this is, the higher the expected reduction in retail broadband prices);
- the intensity of competition in the markets for CAP services (in highly competitive CAPs' markets, price changes are likely to be closely reflective of cost changes, particularly where additional charges apply to all or a significant proportion of CAPs; whereas in less competitive markets, some CAPs may be able to absorb some of the cost increases in their margins);
- the CAP business model (where customers are accessing ad-funded, as opposed to subscription-funded content, the mechanism for pass-through of charges from a CAP to those customers is less clear, and some or all of the charges may be borne by the CAP,[278] while certain CAPs such as BBC may not have any scope to revise customer fees where they need to pay charges to ISPs);
- the magnitude of any charges imposed and whether a charge is cost-based or also includes a mark-up above costs; and
- the structure of any charges imposed (a per volume charge will likely have a greater cost pass-through than a fixed lump sum fee).

7.54   Thus, a charging regime is more likely to result in price changes that benefit consumers overall where: ISPs face intense competition in their retail markets (forcing them to compete away revenue earned from CAPs); the CAPs that are charged have market power (affording them the ability to absorb a proportion of the additional costs in their margins, thus reducing the part of the costs which are passed through in higher retail prices); and where the CAPs that are charged are largely ad-funded.

7.55   In contrast, a charging regime is less likely to benefit consumers overall where: ISPs face weak competitive pressure to lower retail prices; the CAPs charged operate in highly competitive markets; and where the CAPs charge retail subscription fees.

7.56   Overall, in light of various competing price impacts, we consider there is material uncertainty in relation to how a charging regime would impact retail prices for retail broadband, content subscription charges, and what the net impact may be for different customers. The effect in practice is highly likely to depend on the design of the charging regime.

There are potentially significant practical challenges and risks of unintended consequences

7.57   The current rules on traffic management play an important role in safeguarding the open internet and innovation. We do not speculate on how a future charging regime could be implemented through legislation, but as noted above, there are a number of possibilities in

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[277] A charging regime can also have long term impacts, such as an impact on CAPs' ability to compete and innovate in content, and that impact will depend to a degree on the design of a regulatory regime, as discussed below at paragraph 7.59.
[278] See, for example, Greenstein S, Peitz M & Valletti, T, 2016. *Net Neutrality: A Fast Lane to Understanding the Trade-Offs*.

how a charging regime could be designed, both in terms of the basis for such charges (e.g. a CAP could pay an ISP for the volume of traffic delivered or pay for preferential treatment of its traffic) and the nature of charges (e.g. lump sum, per customer or per unit of traffic fees). Given the purpose of regime would be to create better incentives for efficient network use, to be effective it would need to influence the behaviours of the CAPs that generate the most traffic.

7.58   However, there are a number of practical challenges to implementing a charging regime in an effective way. Currently, traffic is not consistently marked in a way that allows its origin or type (e.g. whether it is delay-sensitive video content) to be identified as it is routed through networks. Achieving a consistent and trusted mechanism for marking traffic and ensuring it is used correctly would require multi-lateral and international agreements between CAPs, ISPs, and transit providers.[279] In the absence of an agreed mechanism, it could be difficult to determine which CAP is sending the traffic that an ISP receives and hence which CAP would be liable to pay charges, particularly where there is not a direct interconnection link between an ISP and a CAP.[280] More generally, encryption could be used by CAPs to mask their traffic to avoid paying charges. Overall, where the CAP which originates the traffic cannot be easily identified and charged, a charging regime is less likely to improve the incentives for efficient use of ISPs' networks.

7.59   In principle, a more permissive approach on charging, particularly if it created the possibility of blocking, throttling or degradation of services,[281] could lead to risks that ISPs use it in a way that could undermine the open internet and open internet-based innovation. This could be particularly detrimental to smaller CAPs. Under certain charging regimes, ISPs could have incentives to create scarcity of capacity or otherwise limit quality in certain parts of their network if this allows them to generate higher payments from CAPs. As discussed in some economic literature, ISPs may be incentivised to make as many CAPs as possible pay for prioritised traffic, assuming ISPs cannot generate any revenue from CAPs whose traffic is not prioritised. In these circumstances, ISPs may choose to artificially reduce the quality of internet access services for non-prioritised traffic (e.g. limit the relevant network capacity upgrades), if this forces more CAPs to agree to pay ISPs for prioritisation (for example, because the quality of non-prioritised traffic delivery would no longer make certain content usable or attractive to customers). Depending on the

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[279] Although we note that there are parameters included in data traffic that could in principle allow for traffic to be marked with a certain priority or type.

[280] It is not clear that traffic marking could be used to identify the originating CAP where traffic is routed through other entities. This could incentivise larger CAPs not to directly interconnect in order to avoid charges, even where direct interconnection could lead to more efficient traffic delivery, reducing overall efficiency. Furthermore, if ISPs are not able to charge the CAPs which originate traffic, they may seek to charge CDNs, peering partners or IP Transit providers for those charges to be passed on to originating CAPs. This could make it challenging to design a charging scheme limited to a sub-set of CAPs, if that were the intention.

[281] Removal or adjustment of the relevant sections of net neutrality rules, could in principle, potentially enable ISPs to extract payments from CAPs, through offering traffic management on the basis of commercial considerations (e.g., prioritisation or otherwise enhancing the service offered to CAPs), and credibly pledging to remove or degrade access absent payment. However, competition at retail level could deter ISP from such actions, particularly for 'must-have' content and services which can give the CAPs a degree of bargaining power.

approach taken, there could then be a risk of a two-tier internet, where some traffic is carried on 'dirt roads' and some is carried on paid 'fast lanes'.[282]

7.60   We consider that any charging regime may require a significant degree of regulatory oversight. This oversight could be challenging to deliver, considering the complexity and the dynamic nature of commercial context (e.g. if an intervention was needed to decide on the appropriate cost-based charges applied to CAPs). Furthermore, if a charging regime would be limited to a subset of large CAPs, to safeguard innovation from smaller CAPs, it would be challenging to effectively design the criteria and thresholds used to define and / or revise that subset in a continuously changing environment. Therefore, any considerations of the merits of a charging regime would need to take account of whether it is possible to implement and enforce such a regime in a timely and effective way in line with its objectives, and in a way that minimises the scope for unintended consequences.

Our view on the impact of ISPs charging CAPs

7.61   We acknowledge that in principle there could be benefits to a charging regime, particularly in improving the incentives on CAPs to deliver traffic efficiently. However, we also recognise the difficulties that designing an effective scheme raises, the risks and uncertainty such a change could create, and the unclear impact on consumers. A charging regime would be a significant step and we have not yet seen sufficient evidence that such an approach would support our objectives at this time. We also consider our other proposals provide flexibility that should help mitigate several issues identified by ISPs.

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[282] Our proposals for traffic management and specialised services could create similar potential risks of degradation of quality of general internet access services, which we consider can be addressed by appropriate mitigating measures as discussed in Sections 6 and 8. However, permitting charging would be a starker divergence from the status quo and could have a more significant impact on ISP incentives, and thus could create a greater risk of adverse outcomes.

8. Specialised services

8.1   In this section, we review the rules which apply to non-internet access services provided by ISPs, which are known as 'specialised services'. These are services optimised for specific content, applications or services and to which the main provisions of the net neutrality rules applicable to general internet access do not apply.

8.2   We consider whether this aspect of the net neutrality framework, which imposes conditions on the provision of non-internet services in order to safeguard the open internet, is delivering good outcomes for consumers and is achieving our objectives. We review concerns that the rules, and uncertainty about how they should be interpreted, may be constraining innovation by constraining ISPs' ability to offer services that may benefit consumers.

8.3   We consider whether greater clarity in the guidance and/or a more flexible approach could facilitate innovation by ISPs to better meet the needs of CAPs, businesses and consumers, and thus enhance our objective of maintaining the open internet as an engine of innovation. We also consider how any changes could be designed so as to safeguard citizens' and consumers' access to the open internet.

8.4   We have provisionally concluded that our objectives can be effectively met by issuing guidance that provides ISPs with greater clarity and flexibility in relation to providing specialised services, particularly in terms of meeting requirements to demonstrate the need for optimisation and in demonstrating how they ensure there is sufficient capacity to ensure general internet access services are not adversely impacted.

Background

Treatment of specialised services under the net neutrality rules

8.5   Article 3(5) of the net neutrality rules provides that 'providers of electronic communications to the public'[283] may offer services other than internet access services which are optimised for specific content, applications or services under certain conditions, namely:

- optimisation is necessary in order to meet requirements of a specific level of quality;
- the services are not usable or offered as a replacement for internet access services;
- the network capacity is sufficient to provide these services in addition to any internet access service offered; and
- they are not detrimental to the availability or general quality of internet access services for end users.

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[283] The term 'providers of electronic communications to the public' is defined in Article 2(1) as an undertaking providing a public communications network or a publicly available electronic communications service. Thus, the specialised services rules in Article 3(5) apply to publicly available services provided by ISPs to end users.

8.6   The recitals to the net neutrality rules further explain that optimisation must be objectively necessary to meet quality requirements for specific content, application or services, that cannot be met by general internet access services. The BEREC Guidelines cite voice telephony over 4G (VoLTE), linear broadcasting IPTV services (with specific quality of service requirements), real time health services (e.g. remote surgery) and new machine-to-machine communications services as examples of services that might require optimisation.[284]

8.7   These services are commonly referred to as specialised services, which is the term used in the BEREC Guidelines, although it is not used in the net neutrality rules themselves.

8.8   Private networks and electronic communications services which are not publicly available fall outside the scope of the net neutrality rules. This can include wholesale services provided to other operators including for example, wholesale offers to mobile virtual network operators.

Commercial and wider context

8.9   ISPs provide a wide range of services in addition to internet access services. These include fixed and mobile telephony, business services and networks that support applications such as general business computing, security applications, industrial processes, logistics, telemetry and remote monitoring.

8.10   The range of services that ISPs provide is likely to increase, enabled by developments such as 5G and edge computing, and stimulated by innovation from CAPs with applications such as the metaverse and driverless vehicles. Some of these applications have demanding network performance requirements which cannot be supported by the general internet, particularly in relation to latency, jitter, packet loss or security. If ISPs choose to offer these services, and where such services are publicly available, ISPs need to ensure they are compliant with the specialised services rules.

Ofcom enforcement and monitoring to date

8.11   As part of our monitoring programme, we asked ISPs for information about the specialised services that they provide, and what steps they have taken to comply with the requirements of the net neutrality framework. We have not, however, undertaken any formal compliance activity in relation to specialised services.

8.12   In our annual monitoring reports, we identified the emergence of 5G, network slicing and edge computing as important areas for us to monitor closely given the potential impact on the application of the net neutrality framework, particularly in relation to the specialised services provisions.

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[284] See Recital (16) to the Regulation and BEREC Guidelines (BoR (22) 81), paragraph 113.

The 2021 Call for Evidence

8.13   Respondents to the 2021 Call for Evidence were divided about the impact of the specialised services rules. CAPs generally considered that the net neutrality framework has worked well and has supported innovation that has delivered significant benefits for consumers. The BBC, Meta and Netflix were concerned that any relaxation of the specialised services rules might allow ISPs to undermine net neutrality by degrading or slowing improvement in general internet access services in order to encourage CAPs to purchase additional specialised services, or pay more for them.[285]

8.14   In contrast, although ISPs were generally supportive of the open internet, Three[286], VMO2[287] and Vodafone[288] and trade association Mobile UK[289], considered that the specialised services rules impose conditions which are impeding service innovation, particularly in relation to mobile services.

8.15   BT Group,[290] Three,[291] VMO2[292] and Vodafone[293] were particularly concerned that the specialised services rules would impede new optimised services that ISPs hope to deploy using 5G mobile networks and associated technologies (such as network slicing, multi access edge computing (MEC) and software defined networking (SDN)) which allow mobile services to be customised to end users' needs. They considered these services to be integral to the commercial case for investment in 5G networks.

8.16   In addition, Vodafone suggested that a different approach is required for mobile which recognises the special characteristics of mobile technology including the finite nature of radio spectrum and the future development trajectory of 5G networks.[294]

8.17   KCOM noted that there is potential for operators to deploy services optimised for quality in connection with the rollout of full-fibre networks. It considered that the specialised services rules effectively preclude such developments and should therefore be reviewed.[295] ISPA considered the specialised services rules are too inflexible to accommodate enterprise services which tend to be highly tailored and designed to support innovation, and would impede future business services such as services facilitated by SDN, network function virtualisation (NFV), 5G mobile networks and the IoT.[296]

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[285] The BBC response to the 2021 Call for Evidence, paragraphs 4 and 6; Meta response to the 2021 Call for Evidence, response to question 2; Netflix response to the 2021 Call for Evidence, response to question 1.
[286] Three response to the 2021 Call for Evidence, paragraphs 3.1 to 3.3.
[287] VMO2 response to the 2021 Call for Evidence, p. 5.
[288] Vodafone response to the 2021 Call for Evidence, p. 19.
[289] Mobile UK response to the 2021 Call for Evidence, pp. 3 and 4.
[290] BT Group response to the 2021 Call for Evidence, paras 28-29.
[291] Three response to the 2021 Call for Evidence, paras 4.4.
[292] VMO2 response to the 2021 Call for Evidence, p. 8.
[293] Vodafone response to the 2021 Call for Evidence, paras 38.
[294] Vodafone response to the 2021 Call for Evidence, paras 52.
[295] KCOM response to the 2021 Call for Evidence, paras 3.5 and 6.6.
[296] Internet Service Providers' Association response to the 2021 Call for Evidence, p. 2.

8.18   The ISPs' concerns raised relate both to the substance of the net neutrality framework, which they considered to be overly restrictive, and a perceived lack of clarity about how it should be interpreted in practice.

8.19   Respondents suggested a range of solutions to facilitate innovation including amending the net neutrality rules and adopting revised guidance about the current net neutrality rules. VMO2 suggested that we could adopt an 'outcomes based approach' to enforcement which would permit innovation, including potentially differentiation, provided there are no adverse impacts for consumers.[297] Vodafone suggested that we could adopt a partitioned approach under which ISPs would have flexibility to optimise services for particular categories of devices and services but would be required to ensure there is no discrimination between devices and services in each category.[298] ISPA suggested that enterprise services should be excluded from the net neutrality framework.[299]

Relevant information

8.20   To get a better understanding of the concerns about the specialised services framework, we used our formal information gathering powers to ask the ISPs (BT Group, Sky, TalkTalk, Three, Vodafone and VMO2) whether, and if so, in what way the net neutrality framework had limited or impeded innovation.

8.21   Respondents provided us with details of 28 innovations which they considered had been limited or impeded by various aspects of the net neutrality framework, comprising six innovations which had been launched and 22 innovations which were not launched, or progressed beyond trials.[300]

8.22   Three respondents noted that their responses would understate the volume of impeded innovations since prospective innovations that are likely to be contrary to the net neutrality framework would not have been developed and documented.

8.23   Four of the innovations, all relating to mobile services, appear to have been limited or impeded by respondents' interpretation of the specialised services framework:

b)   VMO2 had considered offering an internet access service relating to a specific use case with higher prioritisation (than other internet access services). It had not launched the service because it considered that it wouldn't meet the criteria for a specialised service.[301]

c)   [✄] had considered offering an internet access service with a facility to [✄]. It had not launched the service because it was uncertain whether it would be consistent with the

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[297] VMO2 meeting with Ofcom, 27 June 2022.
[298] Vodafone response to the 2021 Call for Evidence, para 38.
[299] Internet Service Providers' Association response to the 2021 Call for Evidence, p. 2.
[300] Most of the innovations related to other aspects of the net neutrality framework such as traffic management, zero rating, retail offers for internet access with different quality levels, public interest exceptions and terminal equipment restrictions. We discuss stakeholders concerns about these aspects of the framework in sections 5,6 and 9.
[301] VMO2 response dated 3 May 2022 to the RFI dated 17 March 2022, O2 part 2, p. 4.

obligation to treat all traffic equally, and because any potential effect on other internet access services might be considered contrary to the specialised service requirements.[302]

d) [✂] had considered offering [✂]. It did not launch the service because Ofcom advised it that traffic prioritisation for a particular application would not be consistent with the net neutrality framework.[303]

e) Vodafone said its ability to launch certain specialised services which utilise network slicing had been impeded because it was uncertain what level of impact on the quality of internet access might be considered contrary to the requirements for specialised services.[304]

8.24 We consider that the innovations described in (a) and (b) above are both cases of application agnostic retail offers for internet access rather than specialised services. As we discuss in more detail in Section 6, we are proposing to clarify with guidance that such offers are permitted, subject to transparency requirements and the requirements to meet contracted levels of quality.

8.25 We also asked ISPs to provide us with their assessment of how the net neutrality framework could affect future services over the next five to ten years. All four ISPs that responded to this question said that the net neutrality framework would affect future services:

- VMO2 considered there is a significant risk that the net neutrality framework would inhibit future innovation and drive inefficiencies. It was concerned about 5G services and fixed network services which require optimisation. [305]
- Vodafone said that the net neutrality framework had hindered innovation and ingenuity in the services it can offer. As a result, it said it is unable to develop ideas relating to service prioritisation and tariff innovations, including service concepts similar to services offered in other countries ([✂]). [306]
- [✂] said that Ofcom would need to provide clarity and flexibility in its interpretation of the net neutrality framework to facilitate [✂].[307]
- [✂] said that it was unable to assess the potential effect because [✂]. [308]

8.26 We also sought information about the volume of traffic delivered by specialised services. As we discuss in Annex 8, a small number of ISPs were able to provide estimates or figures of their specialised service traffic. The estimates that we received suggest that specialised service traffic is in most cases a very small proportion of overall traffic volumes.

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[302] [✂] response dated [✂] to the RFI dated 17 March 2022, p. 6.
[303] [✂] response dated [✂] to the RFI dated 17 March 2022, p. 7.
[304] Vodafone response dated 6 May 2022 to the RFI dated 17 March 2022, p. 7.
[305] VMO2 response dated 3 May 2022 to the RFI dated 17 March 2022, O2 part 2, p. 4.
[306] Vodafone response dated 6 May 2022 to the RFI dated 17 March 2022, p. 5.
[307] [✂] response dated [✂] to the RFI dated 17 March 2022, p. 19.
[308] [✂] response dated 28 April 2022 to the RFI dated 17 March 2022, p. 5.

Review of the regulatory framework for specialised services

Our policy objectives

8.27 As set out in Section 4, our review seeks to ensure that the net neutrality framework delivers positive outcomes for consumers by means of three objectives, which are all relevant to our consideration of specialised services:

- safeguarding citizens' and consumers' access to an open internet;
- safeguarding the open internet as an engine of innovation, so that providers of online content, apps and services have strong incentives to continuously innovate; and
- safeguarding well-run, efficient and robust networks.

Current approach to specialised services

8.28 In contrast to zero-rating and traffic management, we have not previously issued supplementary guidance about our approach to assessing specialised services. Our current approach therefore follows Article 3(5) of the net neutrality rules and may also take account of the BEREC Guidelines.

8.29 Under our current approach we are likely to assess the service against the six tests listed in the BEREC Guidelines, which are derived from Article 3(5), namely:

- the service is a service other than an internet access service;
- the service is optimised for specific content, applications or services, or a combination thereof;
- optimisation is objectively necessary in order to meet requirements for a specific level of quality;
- the service is not usable or offered as a replacement for internet access services;
- the network capacity is sufficient to provide the specialised service in addition to any internet access provided; and
- the service is not to the detriment of the availability or general quality of the internet access services for end users.

Has the current approach to specialised services delivered good outcomes?

8.30 Specialised services are relevant to all three of our objectives because they aim to:

- facilitate innovation by enabling ISPs to provide publicly available optimised services; and
- act as a safeguard to ensure that such services are not used to circumvent the net neutrality framework or compromise the quality and availability of internet access services.

8.31 We consider that the current specialised services framework has worked well to safeguard the open internet. As noted above, our monitoring programme has not identified any major concerns in relation to behaviour that would contravene the specialised services rules, and we have not undertaken any formal compliance activity. However, the

specialised services rules, and ISPs' uncertainty about how they should be interpreted, may be restricting innovation and investment by reducing ISPs' incentives to provide services other than internet access. The uncertainty about how to interpret the requirement that specialised services should not affect the general quality of internet access services may also be leading ISPs to invest inefficiently in their networks, by allocating more capacity than is necessary to maintain the quality of internet access services.

8.32 The concerns raised by ISPs relate to two aspects of the specialised services rules:

- The optimisation criteria – These are perceived by some ISPs to set a high bar to offering a specialised service, requiring ISPs to be able to demonstrate that optimisation is objectively necessary to meet quality requirements which cannot be assured over an internet access service. Relatedly, there is uncertainty about whether the criteria are met where optimisation is applied to improve the quality of services which can be supported by an internet access service.[309]

- Impact on the quality of internet access services – The requirement that specialised services must not affect the quality of general internet access is also seen as an impediment to offering specialised services.[310] ISPs' concerns relate particularly to mobile services (including 5G) where capacity is inherently more limited than in fixed networks, and specialised services are typically prioritised over internet access traffic. There is uncertainty about how Ofcom might interpret this condition and a view that a strict interpretation could result in services being judged to be non-compliant.

8.33 A contributory factor to these concerns may be uncertainty about which non-internet services should be classified as publicly available. This may further reduce ISPs' incentives to develop new services by leading them to apply the specialised services rules unnecessarily to services which would not be considered publicly available, and would therefore be outside the scope of the net neutrality framework.

8.34 The scale of the impact on innovation is difficult to quantify. However, there is a risk that any impact could be more significant in future, in particular in relation to 5G networks. As discussed above, 5G is designed to support a wide range of services, including applications such as virtual reality and driverless vehicles which are likely to require optimisation. Similar concerns may also arise in relation to fixed networks as ISPs begin to deploy services to support applications such as enhanced virtual reality and new business/industrial applications.

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[309] Examples could include a virtual reality application which would work more reliably or with better latency with an optimised service, or an augmented reality application which could work with a less capable handset if an optimised service is used.
[310] Article 3(5) specifies that specialised services may only be provided if there is sufficient capacity to provide them in addition to internet access. Also, that they shall not be to the detriment of the availability, and general quality of internet access services.

The framework should support beneficial services which could meet diverse needs, support innovation and encourage efficient use of networks

8.35   Where retail broadband markets are competitive, ISPs should have incentives to develop and improve the choice of services available to align with customer needs. Content, applications, and services requiring an internet or network connection already vary in terms of their quality of service requirements. As set out in Section 3, new and innovative services may begin to emerge both in consumer and business markets that require additional capacity and speed, or other specific quality of service requirements (such as lower latency). Already varied customer needs may therefore become more diverse, requiring ISPs to offer a wider range of services to match customer demand. ISPs may also need to offer non-internet services optimised to the more demanding quality requirements of specific applications or services that are not supported by internet access services.

8.36   Retail competition on quality parameters, and the prospect of attracting a particular customer group who value quality and are willing to pay a premium for it, is a key driver for ISPs to invest in their networks to improve quality of experience. Going forward, differentiation and competition on quality might be particularly important for 5G network roll out, where we expect some customers to increasingly want to rely on quality-sensitive mobile uses and devices (such as augmented or virtual reality uses on-the-go, wearable or industrial IoT devices, for both residential and business customers).[311]

8.37   The availability and take-up of innovative ISP services catering to different customer needs might also have a positive impact on innovation for content and application providers, particularly for applications and services which have quality requirements that are not supported by standard internet access. The availability of such services (e.g. specialised services to support automated industrial processes which require low latency) could in turn support innovation and productivity enhancements in the wider economy.

8.38   Furthermore, clarity about how ISPs can provide optimised services in addition to internet access is important in allowing them to innovate new services and to utilise network resources more efficiently.

8.39   Based on the concerns raised by ISPs above, we would be concerned if these innovations were impeded by a lack of clarity in the rules around the flexibility to develop these offers.

Proposed approach

8.40   The net neutrality rules permit ISPs to offer specialised services subject to certain conditions. However, the current net neutrality framework appears to, or at least is perceived to, suffer from a lack of clarity and flexibility in relation to the provision of such services and may hinder our objectives given the potential benefits for innovation and efficient investment in networks discussed above.

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[311] Ofcom, 2022. *Ofcom's future approach to mobile markets: a discussion paper,* paras 5.4-5.15.

8.41   We therefore propose clarifications about our interpretation of the specialised services rules, and to adopt a more flexible approach to make it easier for ISPs to provide specialised services and do so in a way that uses network resources efficiently. There is a potential risk that greater flexibility to provide specialised services could increase the risk of adverse outcomes for consumers, particularly in relation to the quality of general internet access. Therefore, our proposals include conditions to mitigate these risks.

Proposed guidance

8.42   The main elements covered by the proposed guidance are:

- assessing services against the optimisation criteria;
- assessing the impact of specialised services on the availability and general quality of internet access; and
- guidance about the definitions in the net neutrality rules to make it easier for ISPs to determine whether non-internet services are publicly available services which are subject to the specialised services rules or private services which fall outside the scope of the net neutrality rules.

8.43   We discuss the proposed guidance below and the guidance itself is set out in Annex 5.

Assessing services against the optimisation criteria

8.44   As set out above, one of the perceived barriers to the provision of specialised services is uncertainty about how the requirement for optimisation should be assessed. This could particularly be the case for new services where optimisation could be provided for content, applications or services which may also be accessible using internet access.

8.45   This uncertainty may be harming innovation by inhibiting ISPs from providing specialised services that would support content, applications and services which have specific quality requirements, including those which require additional functionality or a better quality service than can be delivered when they are accessed via the internet.

8.46   Therefore, we want to be clear that where these specific requirements cannot be provided, or provided to a sufficient quality, over the general internet access services provided by ISPs, ISPs can deliver the service via a specialised service. For example, an ISP could offer a specialised service to provide access to a virtual reality application which has quality requirements (such as latency) for optimal performance which are not supported by its internet access, even if the same service is available using internet access but at a lower quality.

8.47   However, we recognise the need to balance supporting innovation with any adverse impacts that may arise from an increased use of specialised services. In particular, there could be adverse impacts on the quality of general internet access services and the experience of end users. For example, in order to justify the need for a specialised service, ISPs could degrade the quality of their internet access services, or there could be under-investment in network capacity so that internet access does not consistently support certain functions.

8.48   As discussed below, we consider that the rules sufficiently protect against this risk. It is therefore critical that we appropriately monitor these requirements to ensure that the quality of internet access services are maintained when specialised services are introduced (and that these continue to improve in line with developments in technology). We discuss this further below.

8.49   Specialised services may only provide access to specific content, applications or services where optimisation is needed and should not be capable of being used to access services or end-points on the internet for which the need for optimisation has not been established. As such, where a service meets the requirements for a specialised service, it is not able to be used to provide general access to the internet. This should address the risk that that the open internet could be undermined by offering specialised services as a replacement for internet access.

8.50   We consider that it is appropriate to allow ISPs to offer specialised services that support innovation in line with our objectives and that any risks from increased provision of these services can be sufficiently protected against. Therefore, we propose to clarify our position by providing:

- greater clarity about the optimisation criteria that makes it easier for ISPs to assess services against the criteria;
- greater flexibility to provide specialised services by clarifying that:

    – we would consider the optimisation requirements to be met if the quality requirements (for the specified content, applications or services) cannot be met consistently by internet access; and
    – it is permissible to offer a specialised service for content, applications or services which can be accessed via the internet, provided that optimisation is needed to provide additional functionality or better quality (than can be supported using internet access); and

- guidance about the permissible impact on internet access, as discussed below.

8.51   Our proposed guidance sets out that:

- Specialised services should provide access to specific content, applications or services where optimisation is needed and should not be capable of being used to access services or end-points on the internet for which the need for optimisation has not been established.
- ISPs may offer specialised services to CAPs, but must not require CAPs to use such services to deliver their traffic.
- We would consider that the optimisation requirements have been met if an ISP is able to demonstrate that:

    – The service provides access to specific content, applications or services and is optimised for such content, applications or services.
    – The service has quality requirements which necessitate optimisation because they cannot be met consistently by internet access during normal operation (e.g. when

the network is not congested), for example by identifying the quality parameters which are not supported by internet access and the impact on the service if it is not optimised (that is the service features which would not function fully if delivered by a general internet access).[312]

- The requirements of new services and their need for optimisation may not be completely understood until the service has been launched and gained a degree of maturity. ISPs should therefore be able to demonstrate a reasonable expectation for the need for optimisation through, for example, service trials where new services are launched using specialised services.
- Specialised services may provide access to content, applications or services which are accessible using the ISP's internet access, provided that it is optimised to deliver additional functionality or a better quality service than can be supported by the internet access.

Assessing the impact of specialised services on the availability and general quality of internet access

8.52   Specialised services may only be offered where sufficient network capacity has been provided to support the provision of the specialised service in addition to any internet access, such that the specialised service is not detrimental to the availability or general quality of internet access for end users.

8.53   As set out above, one of the perceived barriers to the provision of specialised services is uncertainty about how the impact on internet access should be assessed and the acceptable level of impact. The current net neutrality framework is sometimes interpreted to mean that any impact (arising from the provision of specialised services) on internet access is prohibited. This is very difficult to achieve in practice in a multi-service network where prioritisation mechanisms are used to manage network resources. It may therefore be harming innovation by inhibiting ISPs from providing specialised services. It may also be causing ISPs to invest inefficiently in their networks, by allocating more capacity than is necessary to maintain the quality of internet access services.

8.54   We would generally consider that the introduction of a specialised service has not been detrimental to the availability or general quality of internet access service if the contracted quality of service standards continue to be delivered. In the absence of contractual quality standards, we would consider the impact to be detrimental to the availability or general quality of the internet access service if it causes the quality to degrade significantly, as measured by standard quality parameters such as bandwidth, latency, jitter, packet loss and congestion. Where the ISP offers multiple internet access services of different levels, we would expect quality to be maintained on all of its services.

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[312] The quality requirements might include, for example, latency, jitter, packet loss, requirements for guaranteed bandwidth, security requirements or the need for certainty that the service will operate at all times (for example critical network infrastructure related applications).

8.55 We also note that Article 5(1) of the net neutrality rules places a duty on Ofcom to promote the continued availability of non-discriminatory internet access services at levels of quality that reflect advances in technology. It includes provisions for Ofcom to impose requirements on internet access concerning the technical characteristics, minimum quality of service requirements, and other appropriate and necessary measures to promote the continued availability of non-discriminatory internet access services at levels of quality that reflect advances in technology. Although we have no plans to impose such measures at present, we could consider such measures if we become concerned that the quality of internet access services is not keeping pace with advances in technology.

8.56 We therefore propose guidance that:

- provides greater flexibility to provide specialised services by enabling ISPs to adopt a pragmatic approach to the assessment of the impact on internet access;
- specifies clear criteria for an impact that we would consider to be detrimental; and
- specifies the measures that we would normally expect ISPs to have taken to avoid detrimental impacts.

8.57 Our proposed guidance sets out that:

- We would consider the impact of a specialised service to be detrimental to the availability or the general quality of internet access if it causes the quality of internet access to fall below the applicable contractual quality standards for the internet access, or in the absence of contractual quality standards, if it causes the quality of the internet access to degrade significantly, as measured by standard quality parameters such as bandwidth, latency, jitter, packet loss and congestion.
- We would expect an ISP to be able to demonstrate that sufficient capacity has been provided to support the specialised service in addition to any internet access. We would normally expect the ISP to be able to demonstrate that:

  – its capacity planning has taken account of the forecast demand for the specialised service and any internet access; and
  – that sufficient capacity has been provided to maintain the quality of any internet access, consistent with the forecast demand.

- In some cases, it may be sufficient to demonstrate that a specialised service is unlikely to have a significant impact on internet access, for example because:

  – it is physically or logically separated from internet traffic;
  – it does not make significant demands on network resources; or
  – it is used outside peak periods.

- Where a specialised services is offered and an ISP uses traffic management in relation to general internet access services, we would be unlikely to consider this to be

detrimental to the availability or general quality of internet access services where traffic management is used in accordance with Article 3(3) of the Regulation.[313]

Clarifying which non-internet services are subject to the specialised services rules

8.58   The specialised services rules apply to non-internet services which are publicly available.

8.59   We note that one of the perceived barriers to the provision of non-internet services is uncertainty about which services are not publicly available and therefore outside the scope of the Regulation.

8.60   We therefore propose to adopt guidance about our interpretation of the relevant definitions in the net neutrality rules to make it easier for ISPs to determine which non-internet services fall outside the scope of the Regulation. In particular, we propose to give guidance that:

- We interpret publicly available services to be services which are generally available to end-users.
- Non internet services that are offered only to pre-determined, closed end-user groups, so that access is limited to specific institutions, or individuals, even at multiple locations, would not normally be considered publicly available.
- Networks provided exclusively within the site(s) of an individual user/consumer (for example a business) may be considered unlikely to be publicly available. This would be the case, for example, for:
    - corporate private networks;
    - machine-to-machine networks in factories, ports, etc.; or
    - networks within campuses (for example, hospitals and academic institutions).

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[313] We set out our approach to traffic management in Section 6, including our proposal give guidance about traffic management.

> **Case study – Network slicing**
>
> A common theme in responses to the 2021 Call for Evidence and our subsequent discussions with ISPs was the application of the net neutrality framework to the network slicing feature of 5G networks. This is a capability that allows an MNO to create multiple virtual networks (slices) on top of its common shared physical infrastructure. Each virtual network is logically separated and self-contained and is configured to meet the quality requirements of particular applications, services or customers.
>
> Slicing is expected to be used for a range of applications, particularly those which have demanding quality, security and reliability requirements such as emergency services communications, advanced manufacturing and energy distribution networks.
>
> We set out below how the net neutrality framework applies to the main applications for slicing (subject to a case-by-case assessment):
>
> - Services supporting business and industrial applications (e.g. services provided to closed user groups including factory and campus networks). Such services are typically not publicly available and would therefore fall outside the scope of the net neutrality framework.
> - Services optimised for specific content, applications or services with quality requirements which are not supported by internet access. These would be classified as specialised services under the net neutrality framework. ISPs must ensure that such services are not to the detriment of the availability or general quality of internet access in accordance with Article 3(5) of the Regulation and our proposed guidance.
> - Services providing premium quality internet access. These would be classified as internet access under the net neutrality framework. ISPs must ensure that such services comply with Article 3(3) of the Regulation concerning the equal treatment of traffic.

Our approach to monitoring and assessing the impact of specialised services on internet access

8.61   In light of our supervision and enforcement duties set out in Article 5 of the Regulation and to help ensure that specialised services do not impinge on our objectives, we will monitor the impact of specialised services on the availability and general quality of internet access as part of our monitoring programme. To support this programme, we propose that ISPs should routinely collect and store information to provide to Ofcom concerning the specialised services they provide, in order to demonstrate that the specialised services are compliant with the Regulation. That information should include:

- Information demonstrating the need for optimisation, or a reasonable expectation of such a requirement in the case of new services.
- Information demonstrating that the service is not usable or offered as a replacement for internet access.

- Information demonstrating that sufficient capacity has been provided such that the specialised service is not detrimental to the availability or general quality of internet access services.

8.62   Also, as discussed in Section 6, in light of our duty to promote the continued availability of non-discriminatory internet access services at levels of quality that reflect advances in technology, we propose to periodically gather information on network performance, including traffic throughput, latency, jitter and packet loss and other measures of congestion. We also propose to report certain aggregate information about the quality of internet access services to facilitate further transparency.

Consultation questions

> **Question 11:** Do you agree with our assessment of specialised services and our proposed approach?
>
> **Question 12:** Do you agree with the approach in our guidance in Annex 5 in relation to specialised services, including transparency requirements, improved regulatory monitoring and reporting of the need for optimisation of a service, the general performance of internet access services and the impact of specialised services on the quality internet access?
>
> **Please provide any further evidence you have to support your responses.**

9. Scope of the net neutrality rules, terminal equipment and public interest exceptions

Introduction

9.1   The net neutrality rules apply to all publicly available internet access services.[314] For these services, there are specific rules allowing the end-user to use their choice of terminal equipment. As discussed in Section 6, there are also rules that restrict the traffic management practices ISPs can use and some exceptions to these restrictions. One of those exceptions allows traffic management where it is necessary to comply with a legal obligation.

9.2   In this section, we consider the following issues:

a)   internet services provided on transport such as aeroplanes, trains, buses and coaches;

b)   the rights of end-users to use terminal equipment of their choice to access the internet; and

c)   emergency communications, tackling scams, and parental control content filters.

9.3   In summary:

a)   Subject to case-by-case review, we consider that internet services provided on transport are likely to be in scope of the rules. However, we recognise there may be concerns with applying the traffic management rules strictly where the nature of the service means there are constraints on the available capacity. Our view is that we are unlikely to prioritise enforcement of the traffic management rules in these cases.

b)   The rights of end-users to use terminal equipment of their choice to access the internet remains important and should be preserved.

c)   We are unlikely to take enforcement action where there are clear and important benefits for consumers such as in relation to the prioritisation of emergency communications, blocking of scams and provision of parental controls, as long as ISPs act reasonably and proportionately. We are also looking to explore whether we can use General Conditions (GCs) to provide an exception to the traffic management rules where possible in these areas, but otherwise legislative change may be required. We will undertake work to consider this further.

9.4   We are proposing guidance on each of these areas, set out in Annex 5.

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[314] As explained in sections 2 and 8, certain elements of the net neutrality rules (e.g. those relating to open internet access and traffic management) do not apply to non-internet access services provided by ISPs, known as specialised services.

Scope of the net neutrality rules

9.5   The net neutrality rules apply to all providers of 'internet access services', which are
        defined in Article 2 of the Regulation as follows:[315]

> *'internet access service' means a publicly available electronic communications service that
> provides access to the internet, and thereby connectivity to virtually all end points of the
> internet, irrespective of the network technology and terminal equipment used.*

9.6   The recitals to the Regulation explain that sometimes, for reasons outside the control of
        ISPs, certain end-points of the internet may not always be accessible but this should not
        result in a service being deemed not to be an internet access service. However, ISPs should
        not restrict connectivity to any accessible end-points of the internet.[316] The BEREC
        Guidelines provide some further explanation of the scope of the rules, drawing the
        distinction between publicly available services, which are subject to the rules, and services
        which are not publicly available and therefore not in scope.[317]

9.7   Notably, the regulatory framework, for the most part, does not distinguish between fixed
        and mobile internet access services, or between services provided by different
        technologies. In particular, although there are some differences in the transparency
        measures that apply in respect of fixed and mobile services under Article 4 of the
        Regulation, the core net neutrality rules in Article 3 of the Regulation apply equally to all
        services, irrespective of the technology used.

9.8   The traffic management rules therefore currently apply to all internet access services
        provided to members of the public (including business customers as well as domestic
        residential or mobile consumers), without exception.

Terminal equipment

Treatment of terminal equipment under the net neutrality rules

9.9   Article 3(1) of the Regulation provides that end-users of internet access services have the
        right to use terminal equipment of their choice to access the internet. Further, under
        Article 3(3), providers of internet access services are required to treat all traffic equally
        irrespective of the terminal equipment used.[318]

9.10   The right for users to use terminal equipment of their choice does not extend to
        specialised services.

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[315] Article 2(2) of the Regulation.
[316] Recital (4) of the Regulation.
[317] BEREC Guidelines, paras 7 to 18.
[318] For these purposes, 'terminal equipment' means: (a) equipment directly or indirectly connected to the interface of a
public telecommunications network to send, process or receive information; in either case (direct or indirect), the
connection may be made by wire, optical fibre or electromagnetically; a connection is indirect if equipment is placed
between the terminal and the interface of the network; or (b) satellite earth station equipment.

Commercial and wider context

9.11   Consumers access the internet using a range of devices including mobile phones, tablets, desktop computers, set-top boxes and connected TVs. Developments such as IoT and 5G are likely to increase the range and diversity of connected devices that access the internet. Connectivity will become increasingly ubiquitous for home appliances, vehicles and business/industrial devices.

9.12   Connectivity requirements vary by device type, for example, connected devices such as IoT sensors typically generate small volumes of traffic in absolute terms, whereas a connected TV could generate a large volume of traffic.

Ofcom enforcement of terminal equipment rules to date

9.13   In 2018, we opened a formal investigation into Three, which considered its practice of not permitting customers to tether[319] other devices to their mobile phone's internet connection on certain tariffs, as well as some traffic management practices.[320] We closed the investigation after receiving assurances from Three that it would remove the tethering restrictions which had given rise to our concerns.

9.14   In 2021, we undertook initial analysis of an ISP's[321] fair usage policy which prohibited the use of mobile SIMs in fixed routers. We decided that formal enforcement action was not an administrative priority because our review of the net neutrality rules would provide an opportunity to review such restrictions on a cross-industry basis.

Stakeholder views

Responses to our 2021 Call for Evidence

9.15   In response to our 2021 Call for Evidence, BT Group, Three and Vodafone said that the terminal equipment rules limit consumer choice and prevent innovation because they fail to recognise the diversity of terminal equipment used to access the internet. The rules effectively restrict ISPs' ability to offer services customised to suit the requirements of particular devices or device types because ISPs are not permitted to limit usage to those devices in order to manage usage.[322]

9.16   From our discussions with ISPs, we understand that their main concerns about managing usage relate to the use of tethering and mobile SIMs with large or unlimited data allowances being used in fixed routers and with tethering. When consumers use services in these ways, they can generate much larger volumes of traffic than normally associated

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[319] Tethering is sharing a mobile phone or tablet's internet connection with other devices such as laptops.
[320] Ofcom's Competition and Consumer Enforcement bulletin contains a detailed description, see *Own initiative investigation into Hutchison 3G (UK) Limited (Three)'s compliance with the net neutrality and roaming regulations*.
[321] [✂].
[322] BT Group response to the 2021 Call for Evidence, paragraph 31; Three response to the 2021 Call for Evidence, paras 3.12 to 3.16; Vodafone response to the 2021 Call for Evidence, paras 43, 55.

with mobile handsets, potentially leading to localised network congestion and service degradation for multiple customers.

9.17   Three said that it had previously offered a budget mobile service called 'Essentials' which prohibited tethering of other devices and employed traffic management for certain categories of traffic (video, peer-to-peer and VPN) for customers roaming in the EU. It removed the restrictions following Ofcom's investigation and subsequently withdrew the service because it was no longer commercially viable. It argued this had reduced the choice of tariffs available to consumers. It also considered that the service would have been unfair to customers without tethering restrictions, as it would have been forced to raise service charges, resulting in customers with limited data requirements effectively subsidising the minority of high-volume customers who use tethering.[323]

9.18   Respondents considered that ISPs should have greater freedom to limit services to particular devices or device types. Vodafone suggested that we could adopt a partitioned approach under which ISPs would have flexibility to optimise services for particular categories of devices and services, but would be required to ensure there is no discrimination between devices and services in each category.[324]

Information requests to ISPs

9.19   As set out in Section 8, we used our information gathering powers to ask ISPs (BT Group, Sky, TalkTalk, Three, Vodafone and VMO2) whether, and if so, in what way, their interpretation of the net neutrality framework had limited or impeded innovation.

9.20   Three innovations from two mobile providers related to the terminal equipment rules. They were:

- One respondent, BT Group, noted that unlimited data allowances are popular with consumers but have, in a small number of cases, proven costly and damaging to other customers. A small number of consumers use mobile internet access services intended for single users in a way which is harmful to network experience, for example by connecting multiple devices and generating very high traffic volumes, or by using peer-to-peer file sharing. It had considered a range of solutions to give consumers the feel of unlimited packages while protecting the network, but had been unable to adopt several of these solutions because of the terminal equipment rules:

    – Device only service packages – a service customised for, and restricted to, a particular device or type of device; or
    – Tethering restrictions – prohibiting 'tethering' of additional devices (such as a home PC or tablet) to a mobile handset, or restricting the number of devices which can be tethered.[325]

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[323] Three response to the 2021 Call for Evidence, paras 3.12 to 3.16.
[324] Vodafone response to the 2021 Call for Evidence, para 38.
[325] BT Group response dated 6 May 2022 to the RFI dated 17 March 2022, p. 18.

- Another respondent, Vodafone, said it had considered whether it could apply device restrictions to prevent excessive usage of mobile internet access services with unlimited data allowances in fixed devices. The net neutrality rules had prevented it from restricting the number, or type of devices which may be connected, or imposing speed or data allowances on certain types of devices. It was also uncertain whether tariffs based on the number of devices, would be consistent with the net neutrality rules.[326]

Our review of the regulatory framework for terminal equipment

Current approach to restrictions on the use of terminal equipment

9.21   As set out in Section 2, in 2019 we published our Framework document setting out our approach to assessing compliance with certain aspects of the Regulation, based on our experience to-date. Although the main focus of the document was zero-rating offers and traffic management, we also included a brief overview of our approach to the practice of tethering.[327]

9.22   We noted that the BEREC Guidelines made specific reference to tethering, stating that the practice of restricting tethering is likely to constitute a restriction on choice of terminal equipment because Recital 5 of the Regulation explains that ISPs "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 in accordance with Union law".[328]

Has our current approach to terminal equipment delivered good outcomes?

9.23   We consider that the terminal equipment rules have generally delivered good outcomes for consumers and are consistent with our objectives. The rules safeguard access to the open internet by ensuring that consumers can access the internet with their choice of device and by ensuring that ISPs treat all traffic equally, irrespective of the device used to access a particular service. The rules also support innovation by giving device suppliers, CAPs and consumers confidence that the internet may be accessed from any device and used to access any content, subject to the capabilities of the device.

9.24   As noted above, some ISPs consider that the terminal equipment rules limit service innovation because they prevent ISPs from restricting services to particular devices or device types. They argue that device restrictions would enable them to offer a greater variety of internet access services customised to device requirements. Some ISPs also consider that the rules are limiting their ability to manage their networks efficiently because they are not permitted to restrict the use of internet access services to particular

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[326] Vodafone response dated 6 May 2022 to the RFI dated 17 March 2022, pp. 6 and 7.
[327] The Framework document, para 5.2.
[328] BEREC Guidelines on the Implementation by National Regulators of European Net Neutrality Rules, August 2016, para 27. The 2022 BEREC Guidelines include the same text at paragraph 27.

device types to prevent services with large or unlimited data allowances being used in unintended ways.

9.25   Our initial view is that the impact of the terminal equipment rules on service innovation and efficient network management is likely to be small. ISPs have significant flexibility, absent device restrictions, to specify commercial and technical characteristics of internet access services (such as price, bandwidth, data allowance, quality and fair usage policies). ISPs should therefore be able to customise services to make them attractive for use with particular types of devices, to suit the technical characteristics of devices and to prevent or discourage unintended and unreasonable usage. ISPs could, for example, set data allowances and/or fair usage policies consistent with typical mobile usage to deter the use of mobile packages with device(s) that would generate much higher traffic volumes such as fixed devices or large numbers of tethered devices. Although terminal equipment restrictions could give ISPs greater flexibility, we consider that generally, ISPs should be able to customise services to suit device requirements and to address problematic usage without device restrictions.

Proposed approach to terminal equipment rules

9.26   The current net neutrality rules prohibit restrictions on the devices which are used to access the internet.

9.27   We consider that ISPs have significant flexibility under the current rules to specify commercial and technical characteristics of services to suit device requirements and to address problematic usage. Also, as we discuss in more detail in Section 6, we are proposing that ISPs should have greater flexibility to have retail offers with different levels of quality. This could be used to develop retail offers with quality parameters suited to particular device types. We therefore consider that the potential benefits of device restrictions (e.g. the additional flexibility to prevent internet access services being used in ways which could impair other services) are likely to be small. Moreover, these benefits would need to be weighed against the erosion of consumers' freedom to access the internet using the terminal equipment of their choice and the risk that device restrictions could limit innovation in relation to devices and content. Consequently, our initial view is that allowing ISPs to apply device restrictions would not be consistent with our policy objectives.

9.28   We propose to publish updated guidance about the terminal equipment rules to replace the existing guidance in our Framework document and provide clarity on our approach to terminal equipment.

Proposed guidance on terminal equipment rules

9.29   We propose that consumers should be able to use the terminal equipment of their choice to access the internet and that ISPs should treat all traffic equally irrespective of the device used to access the internet. Agreements between ISPs and consumers concerning the technical and commercial characteristics of internet access (including terms in fair usage

policies) should not limit these rights. We also propose that tethering restrictions are likely to be regarded as a restriction on the use of terminal equipment.

9.30   In addition, we propose to clarify that restrictions on terminal equipment used to access specialised services fall outside the scope of the Regulation.

Internet access services on aeroplanes, trains, buses and coaches

9.31   Consumers want to be able to access the internet wherever they go and whenever they need it, including when travelling on aeroplanes, trains, buses and coaches.

9.32   Below we set out our thinking and proposals for access to these internet services, covering:

- the treatment of these services under the current rules;
- our policy objectives for this review;
- a brief summary of the evidence we have considered; and
- our proposed approach.

Treatment of these services under the current rules

9.33   In Section 2, we set out how the net neutrality framework applies to the activities and actions of ISPs. When considering the scope of application of the rules, Articles 1 to 3 of the Regulation are of particular relevance, because they set out the restrictions that apply to all publicly available internet access services. Specifically, Article 3(3) contains the requirement to treat all traffic equally when providing an internet access service, and not to apply traffic management measures for longer than necessary.

9.34   As explained in Section 2, we are no longer required to take utmost account of BEREC Guidelines.[329] However, we note that BEREC considers inflight Wi-Fi to be in scope of the net neutrality rules, where provided to members of the public.[330]

Our policy objectives

9.35   We consider all three overarching policy objectives, as set out in Section 4, are relevant to our considerations here, and they have informed our proposed approach to these services. As we discuss below, different approaches could potentially affect end user choice, innovation, and the efficiency of networks for those providing internet access on transport.

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[329] See paragraph 2.15 in Section 2 of this document.
[330] BEREC, 2020. *Report on the outcome of the public consultation on the draft BEREC Guidelines on the Implementation of the Open Internet Regulation*, p. 6.

Stakeholder information on capacity constraints

9.36   We received a number of comments made in submissions to the 2021 Call for Evidence.[331] We have also sought evidence from relevant stakeholders, through a number of bilateral engagements. Specifically, we have met with Icomera, [✂].[332]

9.37   We set out our understanding of capacity constraints and impacts on passengers below.

Aeroplanes

9.38   Internet access services, while in the air, are largely provided via satellite technology. Connectivity can also be provided by direct air to ground services, however these services are limited to flights over land. Link capacity for satellite and direct air to ground services is constrained.[333] In response to our 2021 Call for evidence, SITA said it considered that the application of net neutrality rules to aeroplanes, "*if interpreted rigidly, are likely to significantly disadvantage airline passengers, owing primarily to a deterioration of service quality that can be provided by in-flight connectivity providers*".[334]

9.39   Recent advances in Low Earth Orbit-based satellite communication technology may alleviate capacity constraints in the future.[335] However, we note it may take some time for these services to be offered on aeroplanes and viable commercial models to emerge.

Trains

9.40   On trains, Wi-Fi internet services are currently provided via mobile networks. There can be capacity constraints in providing these services caused by the limitations in mobile network capacity with respect to the number of passengers on a passing train. There are technology solutions available based on the building of high-capacity track-side infrastructure which could alleviate these constraints. However, building the necessary infrastructure for high-capacity links to the trains has challenges. In part, this is because of the need to access the work within the "rail corridor", which would be needed to build such a network.[336] Such deployments could also be costly, and with challenges in aligning commercial interests and incentives. Nonetheless, there are efforts from the Department of Transport (DfT),[337] Network Rail, the Department for Digital, Culture, Media & Sport (DCMS), the train

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[331] We received a confidential response from SITA.

[332] Meetings with [✂], Icomera on 29 April 2022, [✂], and [✂].

[333] We note that on ships, while sailing in the open sea, internet access services are exclusively provided via satellite technology and hence are likely to face broadly the same capacity constraints as aeroplanes.

[334] Non-confidential extract from SITA confidential response to the 2021 Call for Evidence.

[335] Space, 2022. *SpaceX inks 1st deal to provide Starlink internet service on planes* [accessed 13 October 2022].

[336] For example, there are trackside worker safety concerns, assuring that equipment deployed meets relevant rail standards, and challenges in co-ordinating activities between the different organisations involved including Network Rail, suppliers and works contractors.

[337] For example, DfT has developed a mobile connectivity on rail policy, which aims to improve connectivity on trains. It is also actively working with Network Rail Telecom to help reduce barriers to deploying networks along the rail corridor seeking to reuse existing mast assets. It has also conducted several studies quantifying the challenges and identifying possible solutions.

operators[338] and the UK Space Agency[339] seeking to address these challenges and so capacity constraints leading to reduced customer experience may be resolved in future.

Buses and coaches

9.41   On buses and coaches, connectivity for Wi-Fi internet services is also provided via mobile networks. However, given these vehicles have fewer passengers and travel at a slower speed than trains, their passengers are more likely to experience better connectivity to the internet through these services.[340]

Traffic management on transport services

9.42   Some providers of internet access services on aeroplanes,[341] trains[342] and coaches[343] appear to have taken steps to manage internet traffic on an ongoing basis. One provider, Icomera, argued that it was necessary to do so in order to provide equitable access to onboard internet services for all users and applications.[344]

Proposed approach to internet access services on transport services

9.43   Based on the definition of 'internet access services' set out earlier in this section, our starting point is that all internet access services made available to members of the general public are subject to the net neutrality rules, irrespective of the means of access or technology or equipment used.

9.44   We recognise the benefits of consumers being able to access Wi-Fi on these various modes of transport and recognise in some contexts they are offered at no extra charge to users.

9.45   These internet access services are subject to capacity constraints that are often outside of the ISP's control. We consider it unlikely that capacity constraints will be resolved in the short term, though we acknowledge that the capacity constraints on trains are in principle capable of being addressed.

9.46   We consider that on some types of transport, without some form of traffic management, there might be material consumer detriment. This could occur because of the ongoing risk that a few passengers could use up most of the available bandwidth, meaning many passengers would not be able to use viable internet services. We also recognise that if those providing these services are unable to manage their services effectively, they could decide to stop providing these services at all. In both cases, consumers would lose out

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[338] For example, efforts by London North Eastern Rail and First Group.
[339] DCMS, the UK Space Agency and the European Space Agency (ESA), have been working together to develop a demonstration of hybrid satellite communications and terrestrial network that can be used on trains.
[340] These passengers may also be more likely to get direct connectivity from mobile networks (i.e. via their mobile data rather than Wi-Fi) than rail passengers.
[341] See for example, BA, or Lufthansa.
[342] See for example, London North Eastern Railway or South Eastern Rail.
[343] See for example, National Express's policy.
[344] Meeting with Icomera on 29 April 2022.

through reduced choice, and there may be negative implications for both innovation and network build.

9.47   We recognise that providers of Wi-Fi on transport services can deploy 'fair-use' policies (e.g. download and bandwidth limits) within their terms and conditions, to help manage the risks associated with delivering Wi-Fi services in a context where bandwidth is materially limited – however, this will only address the most extreme cases and more widespread management of services is likely to be needed.

9.48   Given the scope of the net neutrality rules is defined by legislation, Ofcom is unable to exempt or exclude any particular category of services from the application of those rules. However, in interpreting the current rules, as is the case in all areas where Ofcom exercises enforcement functions, Ofcom can decide where best to focus its resources by applying its administrative priorities in deciding which cases to take forward and what actions to take. When assessing the priority of cases relating to internet access on transport, we would consider the benefits, risks of harm and strategic significance of taking enforcement action.

9.49   In this case, we consider that there are clear benefits from enabling more consumers to access internet services on transport, and an inflexible approach to assessing how traffic management is used may have the unintended consequence of reducing consumers' ability to do so.

9.50   Therefore, in the current circumstances, we are unlikely to prioritise enforcement action against traffic management on Wi-Fi services provided on board aeroplanes, trains, buses and coaches in relation to the current net neutrality rules.

9.51   We consider that allowing scope for exceptions, for example in cases where there are significant network capacity constraints, such as in relation to certain types of transport, could be beneficial. However, this is not permitted under the current net neutrality rules. Any changes to legislation would be a matter for Government and Parliament.

Public interest exceptions

9.52   As described in Section 2, Article 3(3) of the Regulation sets out specific obligations in relation to traffic management measures. Measures that meet the description of 'reasonable' traffic management in Article 3(3) are permitted. If the measures implemented by an ISP do not meet all of the criteria to be considered 'reasonable', they may still be permitted if any of the three exceptional cases set out in sub-paragraphs (a) to (c) of Article 3(3) of the Regulation apply. Such 'exceptional' measures must be necessary, and applied only so long as necessary, to:

a) comply with legislation, court orders or orders by public bodies;

b) preserve the integrity and security of networks, services using the networks, or end-user equipment; or

c) prevent impending network congestion, which is exceptional and/or temporary.

9.53   Recital 11 of the Regulation makes clear that the exceptions set out above should be subject to strict interpretation and be proportional.

9.54   Examples of when an ISP may be able to rely on these exceptions would include:

- Blocking illegal images/videos of child sexual exploitation and abuse;[345]
- Complying with a court order to block access to a website containing copyright infringing material;[346]
- Applying traffic management measures to protect the security of their network against a cyber-attack; and/or
- Applying traffic management measures to address temporary congestion, as described in Section 6.

9.55   Under the regulatory regime set out in the Act, Ofcom has powers to make GCs.[347] GCs are regulatory conditions which are of general application and apply to all communication providers (or all providers of networks or services of a particular description) operating in the UK.

9.56   Communications providers have a legal duty to comply with any condition set under section 45 of the Act which applies to them.[348] As such, we consider that where a GC made by Ofcom requires ISPs to block access to certain content, or prioritise one form of traffic over another, or apply any other type of traffic management measure, this would constitute a legal obligation which falls within the exception in sub-paragraph (a) of Article 3(3) of the Regulation. We therefore consider that amendments to the GCs provide a potential route to impose obligations on providers that would constitute an exception to the traffic management rules.

9.57   The rest of this section considers three specific scenarios where it may be beneficial to apply an exception to the traffic management rules under sub-paragraph (a) of Article 3(3):

- **Emergency communications**: the prioritisation of all 999 emergency communications.
- **Scams**: the blocking of scams and communications with intent to defraud users.
- **Parental controls and other content filters**: the availability of adult content filters and parental controls that can be used to block content that is inappropriate for minors.

Emergency communications

Background and objectives

9.58   There is an expectation that people will be able to communicate with 999 emergency services quickly, reliably and using a quality connection whenever the need arises.[349]

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[345] ISPs work in conjunction with relevant bodies, including police forces and the Internet Watch Foundation, to block and remove child sexual abuse and exploitation imagery from the internet.

[346] For example: ISP Review, October 2021, *Six Big UK ISPs Ordered to Block Five Piracy Streaming Websites* [accessed 9 September 2022].

[347] As set out in sections 45 to 64 of the Act.

[348] Section 104(1) of the Act.

[349] References to "999 emergency services" means telecommunications access to police, fire, ambulance and coastguard services in an emergency situation.

Contact with the emergency services should be free and prioritised, regardless of whether the audio or visual call is made over the telephone or the internet, and people should be able to make a call to the emergency services even if they have run out of data.[350]

9.59   In this section, we use 'emergency communications' to refer to these contacts generally, taking into account future technological developments in this area. We think that there is a clear public interest case for removing barriers to prioritisation and zero rating of calls to emergency services given how vital these services are. This also aligns with our objective of ensuring that citizens are able to access a wide range of public services.

9.60   Publicly available fixed and mobile telephony services (i.e. calls) are optimised to meet quality and reliability requirements. Under the net neutrality rules, these services (which use IP-based connections) are classified as specialised services and therefore not subject to the requirement on ISPs to treat all traffic equally. These types of communications are therefore already exempted from the traffic management rules and can be prioritised by communications providers.

9.61   There are other ways of contacting 999 emergency services beyond conventional telephony services, including emergency text relay and video relay calling over the open internet for BSL users. In future, we may also see new uses of different technologies and applications emerge which allow citizens and consumers to contact emergency services.

9.62   These other ways of contacting 999 emergency services are delivered over general internet access services and are not classified as a specialised service. As such, they are subject to the traffic management rules unless one of the specific exceptions in Article 3(3) applies..

9.63   There may also be issues for people trying to contact emergency services in certain situations where they have run out of data. While emergency services could be zero-rated as per our position set out in Section 5, the current framework does not permit zero-rated access when all other content is blocked, including emergency video relay calling.

Stakeholder views and consumer research findings

9.64   In the qualitative research we conducted to inform this review, respondents were asked to consider what services, if any, should be prioritised. The research found that 'only the prioritisation of emergency services and 999 got a complete consensus of support'.[351] Safety was recognised as an important consumer concern, especially in relation to mobile internet access. Among other critical personal communications, not being able to call 999 was perceived as a particular concern (especially among parents and young women).[352]

9.65   We received a small number of representations touching on emergency calling in response to our 2021 Call for Evidence and information requests to ISPs and CAPs. The Communications Consumer Panel and ACOD noted that video relay and telecare alarms are

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[350] GC A3 requires uninterrupted access free of charge to the emergency services for voice calls and GC C5 requires a free emergency video relay service to be provided for users of BSL. These provisions implement and reflect the obligations in Article 109 of the EECC Directive.
[351] Oxygen, 2022. *Qualitative Research Report on Net Neutrality*, p.39.
[352] Oxygen, 2022. *Qualitative Research Report on Net Neutrality*, p39.

not exempt and requested that Ofcom consult further if there is a likely threat to consumers' safety or health.[353]

9.66 One provider referred to our 2021 statement on emergency video relay in which we stated that we would be unlikely to object to emergency video relay calls taking priority in the event that a customer has exhausted their data, noting that they agreed with our conclusion.[354] While this refers specifically to zero rating, we note support for the general principle of the importance of access to emergency services.

9.67 Some responses from ISPs indicated that there are technical challenges to identifying and categorising specific traffic, including video traffic. We acknowledge that these technical limitations could have an effect on an ISP's ability to comply with any narrow changes to the rules around emergency calling in the short to medium term.

Current approach to access to emergency communications

9.68 Ofcom is responsible for ensuring that communications providers fulfil their obligations to enable people to contact 999 emergency services in the UK reliably. Under GC A3, providers of call services are obliged to: (a) ensure that calls can be made to emergency organisations free of charge; and (b) make caller location information available to emergency organisations where this is technically feasible.[355] This applies to both conventional telephone services and to internet-based services capable of making outbound telephone calls. We are also responsible for ensuring that communications providers give sufficient consideration to the needs of disabled people and people whose circumstances may make them vulnerable. These expectations and obligations are set out in GC C5.

9.69 In 2021, we published a statement on emergency video relay, outlining changes to the GCs to enable the introduction of these services.[356] Under GCs C5.11 and C5.12, regulated providers must provide an emergency video relay service approved by Ofcom and ensure that, where technically feasible, this is zero-rated.

9.70 In the statement, we commented on the principle of zero rating of 999 calls made over the open internet and confirmed our view that emergency video relay should be free to access and use. We noted that voice 999 calls are privileged above other calls in a range of ways and that '[o]ur policy is equivalence [for disabled users of communications services], and the consequences of an end-user running out of data during an emergency communication could be serious'.[357]

9.71 We also considered that this important principle of equivalence for disabled people implies that it should always be possible to contact the emergency services and that access to emergency video relay should take priority when access to the internet 'is otherwise

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[353] Communications Consumer Panel and ACOD's response to the 2021 Call for Evidence, p.3.
[354] [✂] response dated [✂] to the RFI dated 17 March 2022, p.7.
[355] Ofcom, General Conditions of Entitlement [accessed 10 August 2022].
[356] Ofcom, 2021. *Statement: Emergency video relay.* Subsequent references are to this document.
[357] Ofcom, 2021. *Statement: Emergency video relay*, p.31.

blocked, either where an account is suspended for non-payment or where a user with a limited data bundle has used up their allowance or it has expired'.[358] We took the view that if ISPs do make emergency video relay available in these circumstances, this is unlikely to be something Ofcom would object to on policy grounds.[359]

Our initial views on prioritising and zero-rating emergency communications

9.72   We set out below our proposals for prioritisation and zero-rating of communications with emergency services. For further details on our position on zero-rating more broadly, please see Section 5.

9.73   We consider that all emergency communications provided to meet the relevant GCs should be prioritised, and to enable that we need to ensure communications providers can prioritise all relevant emergency traffic delivered via internet access services, where it is technically feasible.

9.74   In addition, zero-rating of access to emergency services via internet access services is consistent with existing Ofcom requirements for voice 999 calls (i.e. GC A3). It is also consistent with our proposed overall approach to zero rating. Consumers in need of emergency services do not choose between competing commercial providers and so zero-rating such services could not reduce the incentives of any CAPs to enter the market or the development of new emergency services – the role of the open internet as an engine of innovation is therefore not undermined.

9.75   Applying the obligation to treat all traffic equally also means that ISPs are not able to continue to provide access to emergency services when access to the internet is otherwise blocked, e.g., where a customer has used up their data allowance. However, we consider that consumers must be able to contact emergency services even if they have run out of data, including via calls made over video relay. We also think this contact should continue to be zero-rated and prioritised wherever technically feasible.

9.76   We therefore consider that prioritisation and zero-rating of access to emergency services should be required where it is technically feasible, and that these services should continue to be available where access to the internet is other blocked or restricted.

9.77   Given there is scope within Article 3(3)(a) for national regulators to exempt services that are in the public interest, and Ofcom is responsible for ensuring that communications providers fulfil their obligations to customers by enabling timely and reliable access to emergency services, we consider that the GCs provide an appropriate route for us to ensure any discrepancy between delivery of emergency communications and the net neutrality rules are resolved. Where ISPs are required to prioritise and ensure continuous access to these services under the GCs, this would create a legal requirement under Article 3(3)(a) and an exception to the traffic management rules.

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[358] Ofcom, 2021. *Statement: Emergency video relay*, p.32.
[359] Ofcom, 2021. *Statement: Emergency video relay*, p.32.

We are therefore seeking views on our proposed approach to prioritisation and zero-rating. If we were to decide that changes to the GCs were necessary, we would consult on the specific wording, and associated guidance, in due course.

Enforcement

9.78   We believe that these are proportionate steps which will lead to improved quality and reliability of calls to emergency services, especially as more of these calls are made over the open internet, and will have a positive effect on disabled people's access to good quality telecommunications. While we are considering options in relation to the GCs, it is unlikely that we will take enforcement action against any provider which is reasonably prioritising communications to emergency services, or zero-rating those communications if a user has run out of data, including video relay calling.[360]

Scams

Background and objectives

9.79   This section considers scams in the broader context of targeted attacks against users rather than networks, services or equipment. Where scams or attacks are directed at networks, the services provided over networks, or end users' terminal equipment, those harms can be tackled by measures falling under the provisions of Article 3(3)(b) of the Regulation.

9.80   Our review looks to ensure that people can access and distribute the widest possible range of lawful information online. Therefore, we believe it is important that scammers are disrupted in their activities, and we will continue to try to make it more difficult for scammers to use communications services to reach people.

9.81   Blocking of any content over the internet is prohibited by the net neutrality rules unless it falls under a specific exception. While there are clear routes for service providers to help protect users through screening services for calls and text messages, there is a lack of clarity around the options available to block scams and fraudulent content transmitted over the open internet, such as blocking access to known fraudulent links.

Stakeholder views and consumer research findings

9.82   The majority of respondents in our qualitative research were supportive of blocking unlawful or 'harmful' content at source (i.e. for their ISP to block the content before it had a chance to arrive on their devices).[361] There were very limited views from stakeholders on the topic of scams. Responding to the information request, one provider noted that they had begun work to assess whether it would be possible to block advertising which led to fraudulent content but decided that this could not be developed further because of the net neutrality rules.[362]

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[360] For further details on our position on zero-rating, please see Section 5.

[361] Oxygen, 2022. *Qualitative Research Report on Net Neutrality*, p.36.

[362] [✂] response dated [✂] to the RFI dated 17 March 2022, page 17.

Proposals on scams and fraud blocking over the open internet

9.83   We believe that net neutrality rules should not be a barrier to better consumer protection against scams. Given the important interactions with issues of free speech and fundamental access to the open internet which characterise this debate, we will continue to work on policies to improve consumer protection against online scams while preserving access to the widest range of information on the internet.[363] We will need to consider how to ensure that content is not inappropriately blocked, and that end users can continue to access the content and websites they actually want to see, while balancing the need to protect people in the face of increasingly complex fraudulent criminal activity.

9.84   Our scams work will continue to consider policy recommendations in this space, taking account of relevant ongoing developments in online safety legislation. In the meantime, we are unlikely to prioritise taking enforcement action against ISPs under the net neutrality rules where they block access to scams or fraudulent content, provided that this is undertaken by providers on a reasonable, proportionate, targeted and appropriately evidenced basis.

Parental controls and other content filters

Background and objectives

9.85   Content filters enable people to restrict access to certain types of content on the internet. They can be used, for example, by parents to reduce the risk of children accessing harmful content online ('parental controls') or by businesses to limit what employees can access when using the internet in the workplace. In the UK, Government policy supporting the use of parental controls in particular predates adoption of the net neutrality rules.[364]

9.86   Content filters can be installed in the network or as 'over the top' controls, such as applications on handsets or software in routers. Where they operate 'over the top' in this way, they do not sit within an ISP's network and so are out of scope of the net neutrality rules. However, ISPs also offer parental controls, which sit within their networks, and allow parents to block and filter content. These in-network content filters are subject to the net neutrality rules. Consumer research conducted for this review found that in-network parental controls are valued by domestic and business customers as a tool for controlling what people who use the internet within their premises can see and do online.[365]

9.87   Article 3(3) of the Regulation provides that ISPs should not block content in the network unless one of the exceptions in sub-paragraphs (a) to (c) applies.[366] In 2017 the UK

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[363] This work will be supported by a range of relevant stakeholders, including industry, government, and consumer protection and open rights interest groups.

[364] DCMS, 2014. *Parents unaware of internet filters, says report* [accessed 7 September 2022].

[365] Oxygen, 2022. *Qualitative Research Report on Net Neutrality*, p.37.

[366] The BEREC Guidelines explain that blocking or filtering "in the network" is not permitted (see paragraph 78). However, filters that operate in devices or equipment, including to provide parental control over the content accessed, are not subject to the same rules as they are not part of the internet access service (see paragraph 78c).

Government introduced a provision of domestic law,[367] which states that "[a] provider of an internet access service to an end-user may prevent or restrict access on the service to information, content, applications or services, for child protection or other purposes, if the action is in accordance with the terms on which the end-user uses the service".

9.88 While Government support for the use of internet content filters is clear, we consider the net neutrality rules on traffic management still apply because the domestic legal provision does not place an obligation on ISPs and therefore the exception in sub-paragraph (a) of Article 3(3)[368] is not met. On this basis, there is a degree of legal uncertainty on the continued use of in-network parental content filters.

Stakeholder views and consumer research findings

9.89 One stakeholder suggested, in its response to an information request, that there are potential legal uncertainties in this area.[369] We also note views from a stakeholder, in response to our 2021 Call for Evidence, that incorrect blocking by parental control filters is a problem for some legitimate businesses and individuals, and that users should always agree to filtering.[370]

9.90 All respondents in our qualitative research supported the availability of parental controls, and approval was high. The vast majority also accepted content blocking by premises owners, such as schools, cafés and other places of work. They saw the use of parental controls as the right of the person in charge of the premises. SMEs also value in-network filters for malicious content and fraud blocking.[371]

Proposals on approach to parental controls

9.91 We recognise the value that domestic and business users place on being able to use in-network parental controls, and we agree that customers should always actively consent to filtering of their content through the use of a parental control system. We believe that parental controls provided by ISPs offer a clear benefit to business and domestic consumers.

9.92 Given the benefits from these controls and the Government's position in the Digital Economy Act, we are likely to continue our policy of not prioritising taking enforcement action against the use of parental controls where these are appropriately and sensibly used. Clarifying the use of these controls in the legislative framework could be beneficial. Any changes to legislation would be a matter for Government and Parliament.

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[367] See section 104 of the Digital Economy Act 2017.
[368] I.e. that the blocking or filtering is necessary in order to comply with domestic legislation.
[369] [✂] response dated [✂] to the RFI dated 17 March 2022, page 17.
[370] Open Rights Group response to the 2021 Call for Evidence, pp. 1-3.
[371] Oxygen, 2022. *Qualitative Research Report on Net Neutrality*, p.37.

Consultation questions

Question 13: Do you agree with our assessment of the terminal equipment rules and our proposed approach?

Question 14: Do you agree with our assessment of internet access services provided on aeroplanes, trains, buses and coaches and our proposed approach?

Question 15: Do you agree with our proposed approach to emergency 999 communications services and that we should consider amending the GCs to achieve this?

Question 16: Do you agree that ISPs should be allowed to block scams and fraudulent content and provide in-network parental controls and content filters?

Please provide any further evidence you have to support your responses.

10. Summary and next steps

10.1   In general, net neutrality has worked well and supported consumer choice as well as enabled content providers to deliver their content and services to consumers. However, there are specific areas where we propose more clarity in our guidance to enable ISPs to innovate and manage their networks more efficiently, which we believe will improve consumer outcomes.

10.2   We also set out views on a further set of issues where there may be a case for giving ISPs further flexibility in future but which are not permitted under the current rules and would therefore require legislative change.

10.3   We set out a detailed list of stakeholder questions in Annex 4 and our proposed guidance in Annex 5.

Summary of our proposals and analysis

Our proposed guidance

10.4   We propose to issue the following guidance that clarifies our approach to assessing compliance with the rules:

- most zero-rating offers will be allowed, as set out in Section 5;
- ISPs have flexibility to offer retail packages with different levels of quality, as set out in Section 6;
- ISPs can use traffic management measures to manage their networks, as set out in Section 6;
- ISPs have more scope to develop specialised services, as set out in Section 8;
- as set out in Section 9, we will not prioritise enforcement action where there is clear public benefit, in relation to:

  - the prioritisation and zero-rating of all communications with the emergency services;
  - traffic management of internet services provided on transport;
  - the use of parental controls and other content filters involving the blocking of traffic; and
  - blocking access to fraudulent or scam content.

10.5   In Section 9 we provisionally conclude that the freedom for consumers to use their own choice of terminal equipment remains important and that restrictions on the use of terminal equipment in agreements for internet access services are likely to be contrary to the net neutrality rules.

10.6   We also propose to issue guidance setting out the additional reporting and transparency needed from ISPs to allow us to monitor the effects of the increased flexibility we are providing to ISPs. Our proposals may lead to traffic management being used more often, and so this information will be important for us to safeguard against an adverse impact on

the quality of general internet access services. We need to ensure that all consumers, including those that do not need to purchase premium services, continue to receive internet access at a quality that continues to meet their needs. The information we need to do this relates both to the use of traffic management by ISPs and the general performance of the ISPs' internet access services. We would expect to report on this in our annual monitoring reports.

Areas which are not allowed under the current rules but where we are seeking further views on our analysis

10.7   Our analysis suggests that allowing greater flexibility to ISPs in certain areas could generate positive outcomes, but this is currently not permitted under the net neutrality rules. These are in relation to:

- allowing zero-rated content to be accessed after a customer's general data allowance has been exhausted (Section 5);
- allowing retail offers which guarantee different quality levels for traffic associated with specific content (Section 6); and
- allowing greater flexibility to apply traffic management to specific content to address congestion (Section 6).

10.8   Although we are not making proposals in these areas, as this would require a change to legislation, we are seeking views on the analysis we have set out in this document.

Charging

10.9   Finally, in Section 7, we set out our views on the possibility of allowing ISPs to charge content providers for carrying traffic that might lead to more efficient use of networks. While there are potential benefits to a charging regime, we have not yet seen sufficient evidence that this is needed and believe there is sufficient flexibility provided for ISPs in our other proposals. Ultimately whether or not a charging regime should be introduced in the UK is a decision for Government and Parliament.

Next steps

We invite responses to our consultation by 13 January 2023 and expect to publish our statement in autumn 2023.

The overview section in this document is a simplified high-level summary only. The proposals we are consulting on, and our reasoning are set out in the full document.

A1. Responding to this consultation

How to respond

A1.1   Ofcom would like to receive views and comments on the issues raised in this document, by 5pm on **13 January 2023**.

A1.2   You can [download a response form](#) from the Ofcom website. You can return this by email or post to the address provided in the response form.

A1.3   If your response is a large file, or has supporting charts, tables or other data, please email it to netneutrality2021@ofcom.org.uk, as an attachment in Microsoft Word format, together with the [cover sheet](#).

A1.4   Responses may alternatively be posted to the address below, marked with the title of the consultation:

Net Neutrality Team
Networks and Communications Group
Ofcom
Riverside House
2A Southwark Bridge Road
London SE1 9HA

A1.5   We welcome responses in formats other than print, for example an audio recording or a British Sign Language video. To respond in BSL:

- send us a recording of you signing your response. This should be no longer than 5 minutes. Suitable file formats are DVDs, wmv or QuickTime files; or
- upload a video of you signing your response directly to YouTube (or another hosting site) and send us the link.

A1.6   We will publish a transcript of any audio or video responses we receive (unless your response is confidential).

A1.7   We do not need a paper copy of your response as well as an electronic version. We will acknowledge receipt of a response submitted to us by email.

A1.8   You do not have to answer all the questions in the consultation if you do not have a view; a short response on just one point is fine. We also welcome joint responses.

A1.9   It would be helpful if your response could include direct answers to the questions asked in the consultation document. The questions are listed at Annex 4. It would also help if you could explain why you hold your views, and what you think the effect of Ofcom's proposals would be.

A1.10   If you want to discuss the issues and questions raised in this consultation, please contact the Net Neutrality team by email to netneutrality2021@ofcom.org.uk.

Confidentiality

A1.11   Consultations are more effective if we publish the responses before the consultation period closes. In particular, this can help people and organisations with limited resources or familiarity with the issues to respond in a more informed way. So, in the interests of transparency and good regulatory practice, and because we believe it is important that everyone who is interested in an issue can see other respondents' views, we usually publish responses on the Ofcom website at regular intervals during and after the consultation period.

A1.12   If you think your response should be kept confidential, please specify which part(s) this applies to, and explain why. Please send any confidential sections as a separate annex. If you want your name, address, other contact details or job title to remain confidential, please provide them only in the cover sheet, so that we don't have to edit your response.

A1.13   If someone asks us to keep part or all of a response confidential, we will treat this request seriously and try to respect it. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.

A1.14   To fulfil our pre-disclosure duty, we may share a copy of your response with the relevant government department before we publish it on our website. This is the Department for Business, Energy and Industrial Strategy (BEIS) for postal matters, and the Department for Culture, Media and Sport (DCMS) for all other matters.

A1.15   Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's intellectual property rights are explained further in our Terms of Use.

Next steps

A1.16   Following this consultation period, we expect to publish a statement in autumn 2023.

A1.17   If you wish, you can register to receive mail updates alerting you to new Ofcom publications.

Ofcom's consultation processes

A1.18   Ofcom aims to make responding to a consultation as easy as possible. For more information, please see our consultation principles in Annex 2.

A1.19   If you have any comments or suggestions on how we manage our consultations, please email us at consult@ofcom.org.uk. We particularly welcome ideas on how Ofcom could more effectively seek the views of groups or individuals, such as small businesses and residential consumers, who are less likely to give their opinions through a formal consultation.

A1.20   If you would like to discuss these issues, or Ofcom's consultation processes more generally, please contact the corporation secretary:

Corporation Secretary
Ofcom
Riverside House
2a Southwark Bridge Road
London SE1 9HA
Email: corporationsecretary@ofcom.org.uk

A2. Ofcom's consultation principles

Ofcom has seven principles that it follows for every public written consultation:

Before the consultation

A2.1   Wherever possible, we will hold informal talks with people and organisations before announcing a big consultation, to find out whether we are thinking along the right lines. If we do not have enough time to do this, we will hold an open meeting to explain our proposals, shortly after announcing the consultation.

During the consultation

A2.2   We will be clear about whom we are consulting, why, on what questions and for how long.

A2.3   We will make the consultation document as short and simple as possible, with an overview of no more than two pages. We will try to make it as easy as possible for people to give us a written response.

A2.4   We will consult for up to ten weeks, depending on the potential impact of our proposals.

A2.5   A person within Ofcom will be in charge of making sure we follow our own guidelines and aim to reach the largest possible number of people and organisations who may be interested in the outcome of our decisions. Ofcom's Consultation Champion is the main person to contact if you have views on the way we run our consultations.

A2.6   If we are not able to follow any of these seven principles, we will explain why.

After the consultation

A2.7   We think it is important that everyone who is interested in an issue can see other people's views, so we usually publish the responses on our website at regular intervals during and after the consultation period. After the consultation we will make our decisions and publish a statement explaining what we are going to do, and why, showing how respondents' views helped to shape these decisions.

A3. Consultation coversheet

BASIC DETAILS

Consultation title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

Please tick below what part of your response you consider is confidential, giving your reasons why

Nothing	☐
Name/contact details/job title	☐
Whole response	☐
Organisation	☐
Part of the response	☐

If there is no separate annex, which parts?   _____

_____

If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom aims to publish responses at regular intervals during and after the consultation period. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here.

Name   Signed (if hard copy)

A4. Consultation questions

Zero-rating

Question 1: Do you agree with our assessment of zero-rating offers and our proposed approach?

Question 2: Do you agree with the criteria we use to define Type One, Type Two and Type Three zero-rating offers and our proposed approach to such offers?

Question 3: Do you agree with the approach in our guidance in Annex 5 in relation to zero-rating?

Question 4: What are your views on whether zero-rated content should be able to be accessed once a customer's data allowance has been used up?

Please provide any further evidence you have to support your responses.

Traffic management

Our proposals in relation to retail offers

Question 5: Do you agree with our assessment of retail offers with different quality levels and our proposed approach?

Question 6: Do you agree with the approach in our guidance in Annex 5 in relation to differentiated retail offers, including transparency requirements, improved regulatory monitoring and reporting of retail offers with different quality levels as well as the general quality of the internet access services?

Question 7: What are your views on a more permissive approach towards retail offers where different quality levels are content and service specific?

Our proposals in relation to traffic management to deal with congestion

Question 8: Do you agree with our assessment of how traffic management can be used to address congestion and our proposed approach?

Question 9: Do you agree with the approach in our guidance in Annex 5 in relation to the use of traffic management to address congestion, including transparency requirements, improved regulatory monitoring and reporting of general network performance metrics, the use of traffic management and the impact on service quality?

Question 10: What are your views on a more focused approach to traffic management to address congestion?

Please provide any further evidence you have to support your responses.

Specialised services

> **Question 11:** Do you agree with our assessment of specialised services and our proposed approach?
>
> **Question 12:** Do you agree with the approach in our guidance in Annex 5 in relation to specialised services, including transparency requirements, improved regulatory monitoring and reporting of the need for optimisation of a service, the general performance of internet access services and the impact of specialised services on the quality internet access?
>
> **Please provide any further evidence you have to support your responses.**

Scope of the net neutrality rules, terminal equipment and public interest exceptions

> **Question 13:** Do you agree with our assessment of the terminal equipment rules and our proposed approach?
>
> **Question 14:** Do you agree with our assessment of internet access services provided on aeroplanes, trains, buses and coaches and our proposed approach?
>
> **Question 15:** Do you agree with our proposed approach to emergency 999 communications services and that we should consider amending the GCs to achieve this?
>
> **Question 16:** Do you agree that ISPs should be allowed to block scams and fraudulent content and provide in-network parental controls and content filters?
>
> **Please provide any further evidence you have to support your responses.**