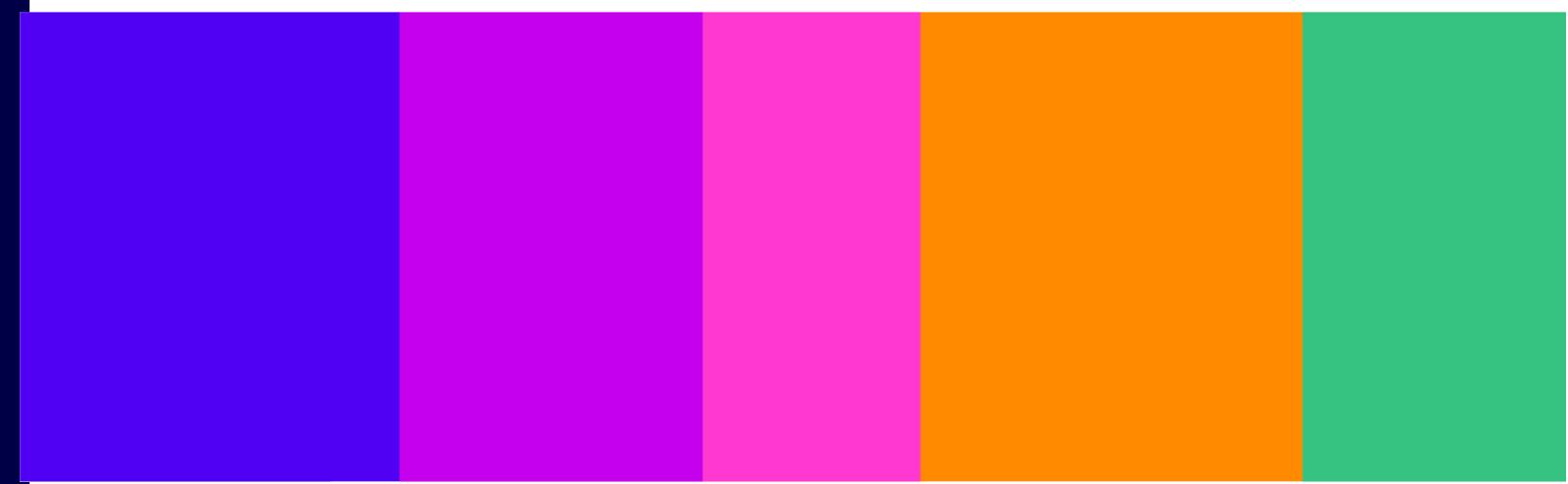


Net Neutrality Review

Non-confidential version: [X] marks confidential redactions

Statement

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1. Overview

- 1.1 Net neutrality supports the ‘open internet’, ensuring that users of the internet (both consumers and those making and distributing content) are in control of what they see and do online – not the broadband or mobile providers (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 in a way that favours some over others.
- 1.2 The internet is an essential part of our daily lives, and 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, Disney+ launched in the UK in March 2020 and had grown to 7.1m subscribers by early 2023.¹
- 1.3 However, because the net neutrality rules constrain the activities of the ISPs, they may be restricting their ability to innovate, develop new services and manage their networks. This could lead to poor consumer outcomes, including higher costs, or 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.
- 1.4 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.
- 1.5 The current net neutrality rules are set out in legislation. 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. In 2021, we started a review of the UK’s net neutrality framework and published a consultation last year. This statement sets out the conclusions of our assessment of the net neutrality framework and our updated guidance on how the rules should apply.

What we have decided – in brief

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 provide 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 means they 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 can buy a cheaper package. Our updated guidance clarifies that ISPs can offer premium packages,

¹ [Q1 2023 Establishment Survey data Barb.](#)

for example offering low latency, as long as they are sufficiently clear to customers about what they can expect from the services they buy.²

- **ISPs can develop new ‘specialised services’:** New 5G and full fibre networks offer the opportunity for ISPs to innovate and develop their services. Our updated guidance clarifies when they can provide ‘specialised services’ to deliver specific content and applications that need to be optimised, which might include real time communications, virtual reality and driverless vehicles.
- **ISPs can use traffic management measures to manage their networks:** Traffic management can be used by ISPs on their networks, so that a good quality of service is maintained for consumers. Our updated guidance clarifies when and how ISPs can use traffic management, including the different approaches they can take and how they can distinguish between different categories of traffic based on their technical requirements.
- **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. Our updated guidance clarifies that we will generally allow these offers, while setting out the limited circumstances where we might have concerns.

We also clarify that we are unlikely to have concerns where ISPs take reasonable approaches to provide services with clear public benefit. This includes enabling ISPs to prioritise and zero-rate access to emergency services, offer parental controls, manage internet traffic on transport and in public spaces where there is limited capacity available, and prevent access to scam websites and other harmful content.

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 enough 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.

Since leaving the EU we have not needed to take account of European guidance, although it has remained part of our approach to net neutrality. We have decided to replace this guidance in its entirety and have now produced a single, comprehensive set of guidance.

Our review

- 1.6 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.
- 1.7 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.

² Latency refers to the time taken for information to travel across the internet.

- 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, including new augmented reality and virtual reality experiences that offer different ways to interact with others and the environment.

- 1.8 These developments have led to competing views on the effectiveness of the current net neutrality framework. ISPs, including mobile network operators, have argued 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 have argued that the rules are necessary to support innovative services, and that they themselves invest heavily in their own networks to deliver traffic more efficiently.
- 1.9 Our objectives for the review have been 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 distribute lawful information online; (2) 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) safeguard well-run, efficient and robust networks.
- 1.10 This review has taken place at an important time in the development of regulatory approaches to online services. The Online Safety Bill, which places new duties on certain services to protect users from online harm has recently passed its final Parliamentary debate and is expected to soon become law, and the Digital Markets, Competition and Consumers Bill, which seeks to establish the regulatory framework for digital markets is currently passing through Parliament.³ Ofcom has set out its approach to engaging in digital markets in the communications sector and this review has been a key part of that work programme.⁴

³ [Online Safety Bill ready to become law](#) [accessed 4 October 2023], [Digital Markets, Competition and Consumers Bill](#) [accessed 4 October 2023].

⁴ Ofcom, 2022. [Digital markets in the communications sector](#).

2. 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 that people can access the content and services they want, and in 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 augmented reality 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 providers, consumer and citizen organisations, trade associations and academics.⁵
- 2.5 Having considered all the responses to the 2021 Call for Evidence we carried out further information gathering and analysis, including sending out formal requests for information (RFIs) to key players in the internet value chain and meeting with stakeholders. We also commissioned qualitative and quantitative research into residential and small business users' views on the UK net neutrality rules.⁶
- 2.6 In October 2022, we published a consultation (the '2022 Consultation').⁷ In the 2022 Consultation we proposed that, overall, the net neutrality framework had worked well in supporting consumer choice and in allowing content providers to deliver their content and services to consumers. However, we said there were specific areas where we proposed that our guidance could provide more clarity to enable ISPs to innovate, and manage their networks more efficiently, to improve consumer outcomes. These included zero-rating offers, premium quality retail offers, specialised services and the use of traffic management.⁸ We also identified several areas where we would be unlikely to be concerned if ISPs took a reasonable approach to providing services with clear public benefit. These included enabling ISPs to prioritise and zero-rate access to emergency services, offer

⁵ All non-confidential responses are available on our website [here](#).

⁶ Ofcom, 2022. [SME consumer experience in the communications market](#); Oxygen, 2022. [Qualitative research report on Net Neutrality](#). Subsequent references are to these publications.

⁷ Ofcom, 2022. [Net neutrality review](#).

⁸ Zero-rating is a commercial practice whereby an ISP does not subtract data usage associated with particular content or a class of content from a customer's data allowance.

parental controls, and manage internet traffic on aeroplanes and trains where there is limited capacity available.

2.7 Our 2022 Consultation also set out views on the following:

- A further set of issues (such as allowing retail packages that prioritise specific content, allowing zero-rated content to be accessed after a general data allowance expires, and allowing traffic management of specific content) where there may be a case for giving ISPs further flexibility in future but which are not permitted under the current rules. These issues would be a matter for Government and Parliament to consider as they would require legislative change.
- The possibility of allowing ISPs to charge content providers for carrying traffic, which might lead to more efficient use of networks. We said that, while there are potential benefits to a charging regime, we have not yet seen sufficient evidence that this is needed, and we believed that there is sufficient flexibility provided for ISPs in our other proposals. Ultimately, whether or not a charging regime should be introduced in the UK would be a decision for Government and Parliament.⁹

2.8 We have considered all the responses to the 2022 Consultation, undertaken further information gathering and analysis (including sending out additional RFIs to key players in the internet value chain), and held additional stakeholder meetings. This statement now sets out our final policy positions.

2.9 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;
- discuss 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

2.10 Rules aimed at protecting the principle of the open internet (the ‘Regulation’,¹⁰ 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 2016.¹¹ The UK left the EU on 31 January

⁹ All non-confidential responses are available on our website [here](#).

¹⁰ *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 6 Oct 2023]. The rules were reviewed by the European Commission in 2019 and its findings are in [this report](#).

¹¹ 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.

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

2.11 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”.

2.12 Internet access services are defined in Article 2 of the Regulation as follows:¹³

‘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.

2.13 The net neutrality rules protect end users’ 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.^{14 15}

2.14 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 content providers need to be able to access the customers of these ISPs to distribute their content. This places ISPs in a gatekeeper position between content providers and consumers. 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 particular content provider’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.

As set out in Section 3, there are other providers in addition to ISPs in the internet ecosystem. These providers can also be 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

2.15 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 that these measures are:

¹² By virtue of section 5 of The Retained EU Law (Revocation and Reform) Act 2023 the net neutrality rules have now become assimilated law.

¹³ Article 2(2) of the Regulation.

¹⁴ ‘End users’, in this context, include residential and business consumers, as well as content providers.

¹⁵ 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.

- > 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.¹⁶

Transparency

- 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.

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

- 2.16 When the rules on net neutrality became part of domestic UK law, a number of small changes were made to the rules to deal with minor issues arising from the UK’s withdrawal from the EU.¹⁷ For example, Ofcom is no longer required 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.

¹⁶ 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).

¹⁷ See [The Open Internet Access \(Amendment etc.\) \(EU Exit\) Regulations 2018](#), made pursuant to Section 8(1) of the [EU Withdrawal Act 2018](#).

BEREC Guidelines

- 2.17 The Body of European Regulators for Electronic Communications (BEREC) has published Guidelines on the Implementation of the EU Open Internet Regulation (the ‘BEREC Guidelines’).¹⁸
- 2.18 As the UK is no longer a member of the EU, Ofcom is no longer required to “take utmost account of” the BEREC Guidelines. In response to stakeholders’ comments to our 2022 Consultation, we have now reviewed the BEREC guidelines and incorporated them where appropriate in finalising the guidance in this document and Annex 1. This is discussed further below.

Ofcom’s duties and powers

- 2.19 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.¹⁹
- 2.20 In doing so, we are required to secure, among other things, the availability throughout the UK of a wide range of electronic communications services.²⁰ 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.²¹ In considering how best to fulfil our general duties, we must also have regard, where appropriate, to the need for the efficient provision of network access and services.²²
- 2.21 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.²³
- 2.22 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.²⁴
- 2.23 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:²⁵

¹⁸ 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.

¹⁹ Section 3(1) of the Communications Act 2003 (the ‘Act’).

²⁰ Section 3(2) of the Act.

²¹ Section 3(4) of the Act.

²² Section 3(4)(d), 3(4)e), 4(7) and (8) of the Act.

²³ Article 5(1), the Regulation.

²⁴ Article 5(1), the Regulation. These reports can be found on Ofcom’s website [here](#).

²⁵ 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.

- 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.

Ofcom framework for assessing compliance

- 2.24 Ofcom published its own approach to assessing compliance with certain areas of the net neutrality rules in 2019 (the '2019 Framework document').²⁶ This outlines the frameworks that we generally apply for assessing compliance of ISPs' zero-rating offers and traffic management measures with the Regulation.²⁷
- 2.25 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 the 2019 Framework document and our annual compliance reports summarise a number of cases that we have assessed.²⁸
- 2.26 In interpreting the current rules, as is the case in all areas where we exercise enforcement functions, we decide where best to focus our resources by applying our administrative priorities when considering which cases to take forward and what actions to take, taking into account benefits, risks of harm and the strategic significance of taking enforcement action. In this document we highlight several areas where we are less likely to have concerns about specific approaches that may be taken by ISPs.

Ofcom's role in assessing the net neutrality framework

- 2.27 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.²⁹ Where we identify areas in which changes to legislation could deliver benefits to consumers, we present these as independent findings.

Purpose and scope of the review

Purpose of the review

- 2.28 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 how both public and private sector organisations operate their businesses and interact with their staff, customers and other organisations.

²⁶ Ofcom, 2019. [Ofcom's approach to assessing compliance with net neutrality rules](#).

²⁷ 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).

²⁸ See sections 3 and 5 of the 2019 Framework document. Our previous annual monitoring reports can be found [here](#).

²⁹ This includes updating or replacing the 2019 Framework document.

- 2.29 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.
- 2.30 To meet these new demands, fixed networks, mobile networks, and content providers are offering new and innovative services. Content providers are investing in bringing new content and functionality into homes and workplaces, and network operators are making further investments in their infrastructure to meet demand, deploying new network equipment, changing their network configurations and developing business models to fund these changes.
- 2.31 In this context, innovation and investment by content providers and ISPs 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 content providers in general consider that it is working effectively.
- 2.32 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.
- 2.33 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 could be beneficial for consumers. 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.³⁰

Scope of our review

- 2.34 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.
- 2.35 In our review we have focused on how the current UK net neutrality framework is functioning, including:
- how well the framework has worked in delivering good outcomes and achieving our policy objectives (as set out in Section 4);
 - 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
 - whether there are areas in which changes to the rules may offer positive outcomes for consumers and citizens, in which case we could present these as independent findings for Government and others to consider.

³⁰ Annex 2 of this document sets out details of different countries' approaches to net neutrality.

- 2.36 On this basis, our 2022 Consultation made proposals in relation to how to approach zero-rating, traffic demands on ISP networks, specialised services, terminal equipment and other exceptions to the rules.
- 2.37 This statement sets out our final positions in these areas. In addition, it provides our updated guidance which includes these final positions and incorporates other aspects of the BEREC guidelines. In our 2022 Consultation, we indicated that we would take account of the BEREC guidelines in areas not covered by our consultation. In response to stakeholder comments, we have now included these areas from the BEREC guidelines so that our guidance is comprehensive and contained in a single place, which will be clearer and easier for stakeholders to reference.
- 2.38 This statement also includes several areas where we have considered whether legislative change could deliver good outcomes for consumers, and discusses the views we have gathered on whether a charging regime would be beneficial.
- 2.39 We will publish our 2023 report for monitoring compliance with the Open Internet Regulation (the 'Annual monitoring report') following publication of this statement. We have also considered how we will monitor and report on net neutrality in light of our positions in this document and we explain our approach in Section 12.

Links with other work

- 2.40 This review is taking place at an important time in the development of regulatory approaches to online services in the UK and abroad.
- 2.41 In September 2022, we published our approach to competition and consumer issues in digital communications markets, setting out our role in regulating these markets and our future work programme.³¹ This review has been part of Ofcom's work on digital markets.
- 2.42 This review also complements the Competition and Markets Authority's (CMA's) work to promote greater competition and innovation in digital markets.³² The Digital Markets, Competition and Consumers Bill, which seeks to establish the regulatory framework for digital markets, is currently passing through Parliament.³³
- 2.43 Our approach to net neutrality is an important factor in the mobile sector. We completed our mobile strategy review which considered how mobile networks might evolve to meet future demand for mobile data and what our future approach should be.³⁴ The Government also published its Wireless Infrastructure Strategy.³⁵ Ensuring that the net neutrality rules enable ISPs to realise the potential for innovation offered by 5G is particularly relevant to this strategy.
- 2.44 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 designed to

³¹ Ofcom, 2022. [Digital markets in the communications sector](#). As part of this work, we carried out a market study into UK cloud services and published a report in October 2023 ([Statement: Cloud services market study](#)).

³² CMA, 2022. [CMA's Digital Markets Unit: exciting opportunities to influence the regulation of big tech](#). [accessed 6 October 2022].

³³ [Digital Markets, Competition and Consumers Bill](#) [accessed 4 October 2023].

³⁴ Ofcom, 2022. [Conclusions: Ofcom's future approach to mobile markets](#).

³⁵ DSIT, 2023. [Wireless Infrastructure Strategy](#).

promote competition and investment in gigabit-capable networks – bringing faster, better broadband to people across the UK.³⁶

- 2.45 We are currently undertaking work considering the future of TV distribution. Changes in how TV is delivered could have an important impact if they lead to a large increase in the delivery of video content over the internet. Ofcom has published a Call for Evidence on a broad range of issues relating to the long-term future of TV distribution.³⁷

Impact assessment

- 2.46 Section 7 of the Communications Act requires us to carry out and publish an assessment of the likely impact of implementing regulatory changes which would be likely to have a significant impact on businesses or the general public, or when there is a major change in Ofcom’s activities.
- 2.47 More generally, impact assessments form part of good policy making and we therefore expect to carry them out in relation to a large majority of the decisions we make. We use impact assessments to help us explain the policy decisions we have decided to take and why we consider those decisions best fulfil our applicable duties and objectives in the least intrusive way. Our impact assessment guidance sets out our general approach to how we assess and present the impact of our decisions.
- 2.48 The analysis presented in this document constitutes an impact assessment as defined in section 7 of the Act. Our analysis of different policy issues is set out across the sections that follow (e.g. zero-rating in Section 5, traffic management in Section 6, etc.). We have identified and analysed policy options for amending aspects of our approach to net neutrality, including assessing evidence on the potential benefits and risks of such changes. We have assessed these options against the alternative, or counterfactual, that absent this review our current approach would remain in place. Our guidance contains those changes which we consider would most effectively and proportionately satisfy our objectives compared to that counterfactual.

Equality impact assessment

- 2.49 We have given careful consideration to whether the decisions 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 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 1998.³⁸
- 2.50 We consider that some of our decisions would have a positive impact on certain groups of consumers. For example, we are removing barriers in the current net neutrality framework to prioritising and continuously zero-rating emergency communications traffic, including

³⁶ Ofcom, 2021. [Statement: Promoting investment and competition in fibre networks – WFTMR 2021-26](#). Subsequent references are to this publication.

³⁷ Ofcom 2023. [Call for evidence: Future of TV Distribution](#).

³⁸ Further detail is set out in section 149 of the Equality Act 2010 and section 75 of the Northern Ireland Act 1998.

emergency video relay traffic. The latter in particular helps promote equivalent access to emergency communications for disabled people. We are also protecting people that are vulnerable to scams and other harmful material, and allowing access to information that is helpful for vulnerable customers when their internet service is otherwise blocked, which could also benefit people with protected characteristics including age and disability.

- 2.51 We clarify that differentiated retail offers with different quality levels (where all of the customer's traffic is treated the same) are permitted. While we expect ISPs to maintain quality across all internet access services, different quality levels mean that there could be a risk of adverse effects for people who are not on higher quality packages, who may share one or more protected characteristics including age. These users may see reduced performance, for example during very busy periods if their traffic is given lower priority. However, a lower priority may not necessarily lead to reduced performance if the traffic generated by these users is less quality sensitive.
- 2.52 We consider that potential adverse effects will be mitigated by requiring ISPs to be transparent about their products and policies and in a way that can be understood by consumers. We also intend to mitigate any potential adverse impacts through our monitoring and compliance work. In particular, we intend to monitor the general quality of internet access services and also the incidence of zero-rating, differentiated retail offers, and the use of specialised services that could have an impact on quality. Our detailed assessment of differentiated retail offers is provided in Section 7, and our approach to monitoring compliance is outlined in Section 12.

Welsh Language Assessment

- 2.53 The Welsh Language (Wales) Measure 2011 made the Welsh language an officially recognised language in Wales. This legislation also led to the establishment of the office of the Welsh Language Commissioner who regulates and monitors our work. Ofcom is required to take Welsh language considerations into account when formulating, reviewing or revising policies which are relevant to Wales (including proposals which are not targeted at Wales specifically but are of interest across the UK).
- 2.54 Where the Welsh Language Standards are engaged, we considered the potential impact of a policy change on (i) opportunities for persons to use the Welsh language; and (ii) treating the Welsh language no less favourably than the English language. We also considered how our approach could be formulated so as to have, or increase the likelihood of, a positive impact, or not to have adverse effects or decrease any adverse effects.
- 2.55 Our approach to net neutrality has been designed to ensure that people can access the content and services they want, and to enable content and service providers to reach users and audiences online. This includes content in the Welsh language. We do not believe that the approach in this statement will have a negative impact on Welsh language users and the content they want to access.
- 2.56 We believe that there are likely to be some positive effects on the use and treatment of the Welsh language. This is because our approach seeks to ensure that consumers across the UK can access any content they choose, which in turn is likely to have positive effects on Welsh speakers accessing content in Welsh.

Environmental impact

- 2.57 Separate to this review, Ofcom has engaged with stakeholders on the issue of sustainability and understanding the role of communications services in enabling the reduction of carbon emissions in other sectors.³⁹ While Ofcom does not have any specific obligations or duties in relation to sustainability and the environment, we understand that for many companies, it is likely to be one of several contextual drivers of decision-making.
- 2.58 We consider that our improved guidance on reasonable traffic management and addressing congestion is likely to contribute to more efficient network utilisation, reducing the quantity of network equipment required to deliver a given traffic volume, thereby reducing the carbon footprint. However, we also recognise that as traffic volumes grow, it is likely to be efficient to deliver more traffic via equipment placed in ISPs' networks closer to the consumer. Where this leads to more equipment being deployed overall, this could lead to higher energy usage, depending on the specific equipment deployed.
- 2.59 We also expect that our revised guidance could contribute to traffic growth by making it easier for ISPs to provide services to end users (including differentiated retail offers for internet access services, specialised services and zero rating offers). This could increase carbon emissions on the basis that carbon emissions are positively correlated with traffic volumes. However, the overall picture is uncertain because some specialised services traffic may be substitutable, i.e. replacing internet access traffic, and with more efficient delivery mechanisms. There is also likely to be an offsetting improvement in energy efficiency over time. Existing forecasts of carbon footprints, for example in relation to 5G mobile networks, are likely to already account for these increases.
- 2.60 Telecoms services will also play a role in facilitating decarbonisation of other sectors of the economy, but the extent to which this will take place has not been fully quantified. For example, insofar as some internet access services and specialised services could allow for more remote working, this could reduce emissions from transport.
- 2.61 Our decision to clarify that we are unlikely to have concerns about Type One and Type Two zero-rating offers may encourage ISPs to universally zero-rate environmental charities and non-governmental organisations (NGOs) for their customers. This could in turn improve access to information which raises awareness of climate issues and promotes environmentally-friendly policies and practices, thereby indirectly contributing to decarbonisation. Consumer demand for more sustainable products may also push ISPs to zero-rate environmental charities and NGOs for all their customers.
- 2.62 We do not consider that there are significant environmental impacts from our other policy decisions in this space.

Structure of this document

- 2.63 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;

³⁹ See [Ofcom's Plan of Work 2022/23](#), p. 30 and p. 53. Subsequent references are to this publication.

- Section 5 sets out our approach to zero-rating;
- Section 6 sets out our approach to managing the impact of traffic demands on ISP networks;
- Section 7 sets out our position on differentiated retail offers;
- Section 8 sets out our position on internet access on transport, other public spaces, and public interest exceptions;
- Section 9 details our approach on consumer choice of terminal equipment;
- Section 10 sets out our approach on Specialised Services;
- Section 11 discusses the impact of allowing ISPs to charge content providers;
- Section 12 set out our approach to monitoring compliance with the net neutrality framework and our guidance; and
- Section 13 provides conclusions on our approach to the net neutrality framework.

2.64 The Annexes are set out as follows:⁴⁰

- Annex 1: Guidance on Ofcom’s approach to assessing compliance with the net neutrality rules;
- Annex 2: International case studies;
- Annex 3: Data on traffic and costs;
- Annex 4: Discussion of the economics of allowing ISPs to charge content providers;
- Annex 5: Consumer outcomes;
- Annex 6: Glossary and abbreviations.

⁴⁰ Annexes are available separately on the Ofcom website [here](#).

3. Market context

Introduction

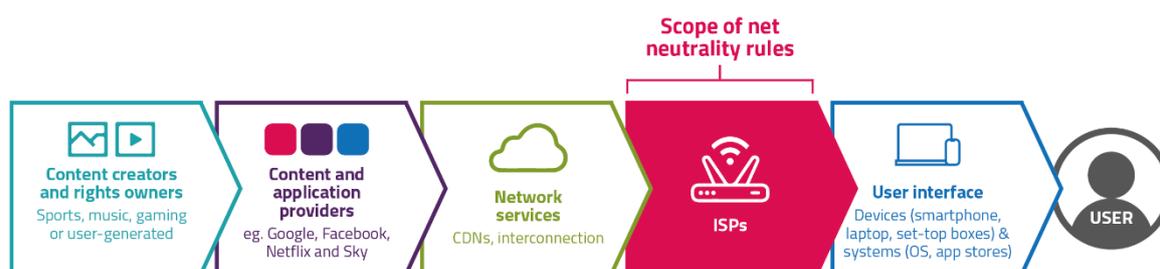
- 3.1 In this section, we provide context that informs our discussion and conclusions in the following sections of this document.
- 3.2 While ISPs continue to have a key role in connecting consumers to the internet, which provides the potential for them to act as gatekeepers of what consumers can access, the internet value chain is complex and has changed significantly since the net neutrality rules were introduced. Large content providers, some 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 devices, browsers, and operating systems – plus the associated app stores – 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 investment to provide sufficient capacity to carry very large peaks in traffic due to, for example, popular sports being shown live on the internet. Content providers 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 by networks so that consumers have continued to be able to access the content they want, when they want it. Their experiences are generally positive including in relation to pricing, although prices have begun to increase recently, and may continue to increase along with wider cost of living increases.
- 3.5 We expect new technologies and new applications will drive demand for greater internet 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 content providers will need to continue to evolve their networks and their services 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.⁴¹ 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.

⁴¹ Annex 3 of this document sets out some of our findings about data traffic trends in more detail.

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 by the net neutrality rules.

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 content provider that hosts the content. Users can be either residential consumers or businesses. The content is then delivered to them.⁴² Traffic flows are very often asymmetric, with the request using a small amount of data and the content delivered being much larger.⁴³

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 content providers directly for their services, for example via monthly or annual subscriptions.

Content providers

3.13 A content provider provides 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. Content providers serve a very wide range of segments and can operate different business models.

3.14 The leading content providers accessed by UK consumers include the largest global technology firms (sometimes referred to as 'Big Tech').⁴⁴ Some of these companies have particularly high reach such as Meta,⁴⁵ and Alphabet,⁴⁶ that are used by almost all online adults, with Amazon and Microsoft coming third and fourth respectively.⁴⁷ When looking at

⁴² Sometimes after the content provider has checked permissions, such as the user having the appropriate subscription.

⁴³ Some content may be pushed to consumers without an explicit request, such as software updates.

⁴⁴ Big Tech firms typically refer to the largest global technological companies such as Alphabet (Google), Apple, Meta, Amazon and Microsoft.

⁴⁵ Primarily Instagram, WhatsApp and Facebook.

⁴⁶ Primarily Google Search and YouTube.

⁴⁷ 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.

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.^{48 49} When measured by traffic throughput in the busy hour, a small number of content providers 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.⁵⁰

- 3.15 Many of these large content providers 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.⁵¹ 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).⁵² Similarly, a recent study by BEREC notes that the Big Tech firms are the main actors not only as content providers but also in various parts of the internet ecosystem globally.⁵³
- 3.16 There are other content providers 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.⁵⁴ There is also a long tail of smaller providers that provide a range of services.

Network services⁵⁵

- 3.17 In order for ISPs to provide internet access, and for content providers to deliver their content to consumers, networks need to be connected. Content providers and ISPs may use Content Delivery Networks (CDNs), various interconnection approaches, and internet backbone ISPs in order to deliver the traffic.

Content delivery 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.
- 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

⁴⁸ Ofcom, [2022 Online Nations](#), p. 18.

⁴⁹ 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).

⁵⁰ We note that whilst the majority of Sky's pay TV base has been delivered over satellite, it now offers an IPTV service, Sky Glass, which is growing, and also offers other over-the-top applications and services (e.g. NOW, Sky Go and other mobile applications).

⁵¹ CMA, 2020. [Online platforms and digital advertising Market study final report](#).

⁵² CMA, 2022. [Mobile ecosystems Market study final report](#).

⁵³ BEREC, 2022. [Draft BEREC Report on the Internet Ecosystem](#), Section 5 (*Main actors of the internet ecosystem*).

⁵⁴ Content providers 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.

⁵⁵ 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.

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 Content providers may provide their own caches or may purchase a hosting service from a third party CDN such as Akamai, AWS, and Edgio.⁵⁶ Only the largest content providers 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.⁵⁷ The benefit to a content provider of deploying its own caches is that they afford it greater control of how content is stored and delivered, and it can be tailored to the content provider's business model.⁵⁸
- 3.21 Third party CDNs host content from multiple content providers. Where content providers 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 content providers 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.⁵⁹ Third party CDNs usually offer contracts that give the content provider specific quality of service guarantees and access to the latest codecs,⁶⁰ encryption, and adaptive bitrate (ABR) technologies,⁶¹ 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 content providers to distribute their content.
- 3.23 ISPs and content providers 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 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. Peering may be by direct connection between networks (known as private peering), or at an internet exchange point (known as public peering). Typically, the exchange of traffic via peering is settlement free because it is regarded as mutually beneficial by both parties.⁶²

⁵⁶ Edgio was formerly known as Limelight.

⁵⁷ Netflix, [Open Connect](#) [accessed 21 October 2023].

⁵⁸ 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.

⁵⁹ If different content providers 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 content providers' traffic would be delivered at different times.

⁶⁰ Codec technology is used to encode a signal, and can be used to compress the data, which reduces the transmission bandwidth or storage space.

⁶¹ 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.

⁶² Interconnecting parties may agree payments for peering where one party accrues greater benefit from the arrangement.

3.25 As explained in Annex 3, for the major ISPs, just over 50% of traffic is delivered via caches deployed in ISPs' own 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 third party datacentres. Of the remaining traffic, approximately 4% is delivered via public peering and 7% via IP transit.⁶³

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 the content provider's 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, content providers pay for the amount of traffic that is delivered, and may pay more for higher quality service guarantees.

3.27 CDNs and content providers 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 content providers 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.⁶⁴

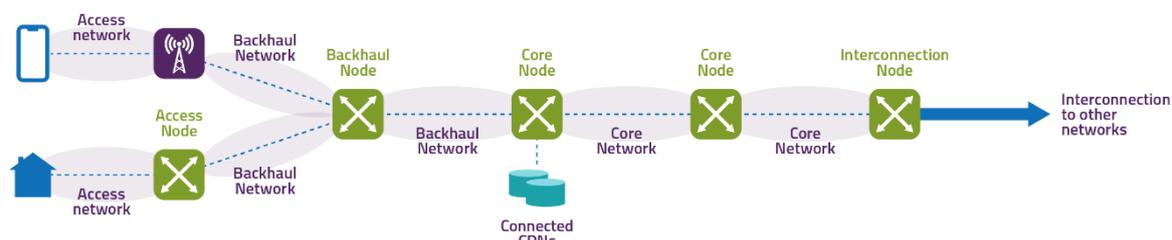
3.28 Each of these agreements between content providers, CDNs, datacentres, ISPs and transit providers is negotiated commercially so different parties may incur higher or lower costs to deliver traffic.

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.⁶⁵

Figure 3.2: Access, backhaul and core networks⁶⁶



Source: Ofcom diagram

⁶³ 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.

⁶⁴ Their own network deployments may include laying their own sub-sea cables to connect consumers to content globally. Alternatively, they may buy capacity on other sub-sea cables, where available.

⁶⁵ Such as mobile broadband, satellite or fixed wireless access.

⁶⁶ 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.

- 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.⁶⁷ 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.⁶⁸
- 3.32 In relation to fixed broadband services, most residential consumers purchase their service from BT Group (33%), Sky (23%), Virgin Media O2 (20%) or TalkTalk (9%).⁶⁹ 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.⁷⁰ Virgin Media O2 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.^{71 72}
- 3.34 For mobile connectivity services, there are four national mobile network operators (MNOs) in the UK – EE, Vodafone, Virgin Media O2, and Three 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.⁷³ In addition, there are a large number of non-MNO owned mobile virtual network operators (MVNOs)⁷⁴, 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 interfaces

- 3.35 The user interface determines how a consumer interacts with the internet. 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 (for iOS).

⁶⁷ 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.

⁶⁸ In general, there are more access sites than backhaul sites and more backhaul sites than core sites.

⁶⁹ Ofcom, 2023. [Communications Market Report 2023 – Interactive data.](#)

⁷⁰ Openreach is a legally separate entity owned by BT Group. The Openreach network can serve virtually all premises in the UK excluding the Hull Area, where KCOM owns and operates the largest network.

⁷¹ For example, Jurassic Fibre or B4RN.

⁷² Ofcom, 2021. [WFTMR 2021-26.](#)

⁷³ Based on operator data.

⁷⁴ An MVNO is a mobile provider that does not own the wireless network infrastructure over which it provides mobile services to its customers.

Accessing the internet through other types of gateways, such as connected TVs and smart speakers is also increasingly popular.

- 3.36 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, such that a consumer's choice of device and software may impact the ways they access internet content.

Consumer outcomes

- 3.37 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 content providers (such as ultra-high definition (UHD) TV and virtual reality). As set out in Annex 9 of our 2022 Consultation, based on research we carried out for this review, both residential and business consumers are currently largely satisfied with their mobile and fixed services.
- 3.38 The analysis of pricing included in our Pricing Trends reports indicates that up until around 2020/2021 prices for fixed broadband and mobile phone services were stable or falling in real terms. More recently, many of the UK's largest fixed and mobile telecoms providers have introduced inflation-plus annual price increases, and the abnormally high inflation levels since late 2021 have resulted in prices beginning to increase for many existing customers (although the prices available to new customers have been less affected).⁷⁵ While prices are increasing, growing average data use means consumers are getting more value from monthly data allowances. Improvements to connectivity (such as 5G and full fibre) also mean that consumers are getting a better user experience. A range of offers available at different price points remains available to consumers, as highlighted in our latest report on the affordability of services, but we are concerned at the number of consumers struggling to afford their communications services.⁷⁶

Recent trends in traffic in the UK

- 3.39 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, content providers can use techniques that reduce the potential impact of their traffic on ISP networks while maintaining a good user experience.
- 3.40 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 network costs tend to be the most sensitive to traffic and capacity improvements tend to be more incremental and

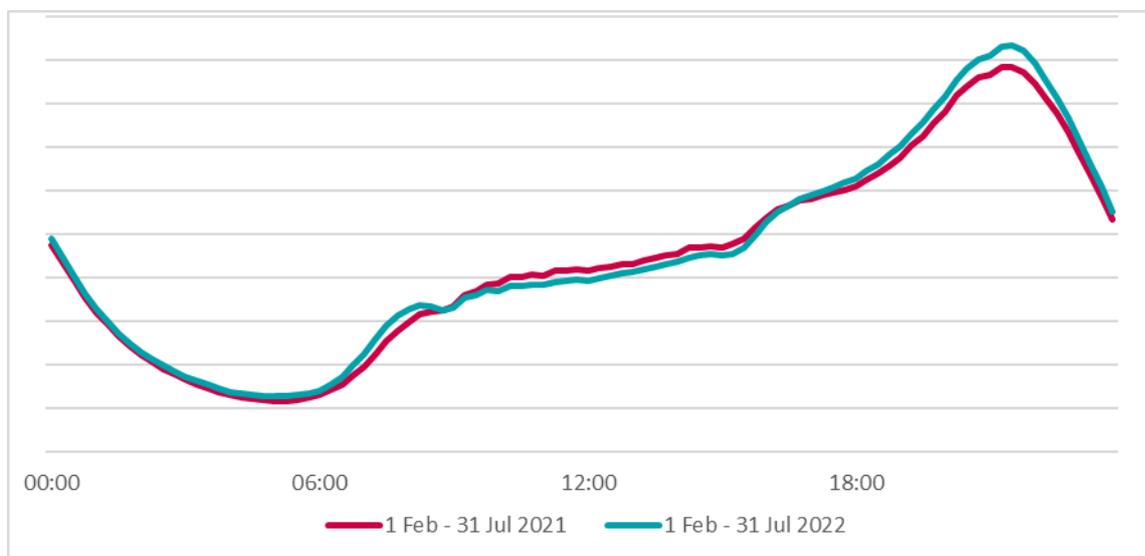
⁷⁵ We note that a comparison of prices year-on-year does not necessarily take into account increased usage and quality improvements.

⁷⁶ Ofcom, [Pricing trends for communications services](#) reports and [Affordability of communications services report update \(April 2023\)](#).

frequent. In the fixed 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.⁷⁷ In mobile networks, access, backhaul and core network costs are all 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 to manage traffic when their networks get exceptionally busy.

- 3.41 Overall traffic in the UK continues to grow. The average year-on-year traffic growth over the period 2013 to 2022 was 38% for the average fixed broadband consumer, while average growth was 25% for the average mobile data consumer over the period 2017 to 2022. 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.⁷⁸
- 3.42 Traffic demand tends to peak daily in the evening (around 8pm) when residential consumers use popular services. The traffic in this busy hour has also grown. Figure 3.3, reproduced from the 2022 *Connected Nations* report, shows a typical demand profile for a fixed ISP across a day, which peaks at around 8pm in the evening.⁷⁹ It shows a small growth in the busy hour peak for 2022 compared to 2021, but that there was a slight reduction in daytime traffic, possibly due to a shift back towards more office working following the Covid-19 pandemic.

Figure 3.3: Average traffic profile (Gbit/s) for fixed connections on weekdays



Source: *Connected Nations*⁸⁰

⁷⁷ As explained in Section 11 and Annex 3, 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.

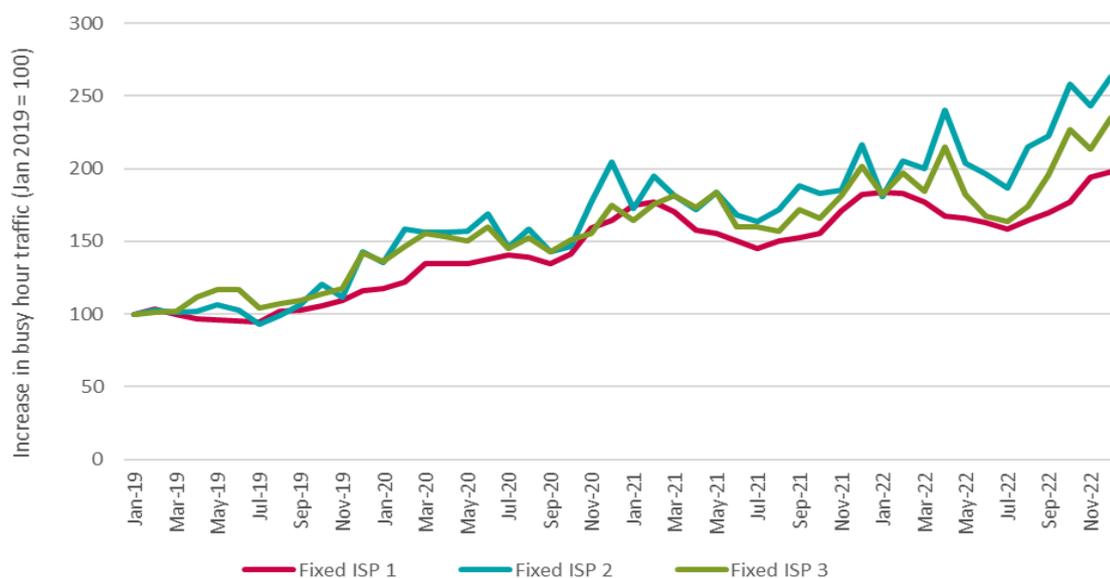
⁷⁸ We note that this aligns with the medium growth scenario in our [Discussion paper: Meeting future demand for mobile data](#), which assumed a growth rate on mobile networks of approximately 40%. Subsequent references to this discussion paper are to this document.

⁷⁹ Ofcom, 2022. [Connected Nations 2022](#). See Figure 2.13.

⁸⁰ Ofcom, 2022. [Connected Nations 2022](#), Figure 2.13. 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.

3.43 The growth of traffic on the networks of three 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, 15% from 2020 to 2021, and 14% from 2021 to 2022. Traffic is generally highest in December, so that the busiest periods on the network are evenings in December.

Figure 3.4: Average traffic in the busy hour for selected fixed ISPs by month⁸¹



Source: Ofcom analysis based on RFI data⁸²

3.44 A large portion of the busy hour⁸³ traffic (in the region of 50%) on fixed networks is driven by five large content providers, specifically Amazon, Facebook, Google, Netflix and Sky.⁸⁴

3.45 Networks have experienced traffic peaks where the traffic is significantly higher than the usual busy hour traffic. The evidence we have gathered shows that these exceptional traffic peaks have arisen as a 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.⁸⁵ 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. Further evidence and analysis is provided in Annex 3.

3.46 ISPs have built their networks to take account of these peaks, with the objective that, at the busiest times on the network, adverse impacts on network performance (such as

⁸¹ 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.

⁸² Note that the definition of the busy hour varies across different ISPs. [X]; [X] and [X].

⁸³ 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.

⁸⁴ We note there were limitations to the data received. A number of the [X]. Two CDNs, Akamai and Edgio, also contribute a material proportion of traffic throughput in the busy hour. Further, we note that ISPs [X]. Therefore, a significant portion of Amazon traffic will also be attributable to its own CDN, which will be carrying both Amazon and other content providers’ traffic. As such, the amount of traffic attributable to Amazon’s content will be an overstatement.

⁸⁵ We gathered information on the top ten peaks on each ISP’s network in each of the last four years to assess the drivers of exceptional peaks.

congestion, higher latency, jitter or packet loss) are not material.⁸⁶ Where the network does suffer material impacts, which may be most likely during exceptional traffic peaks above the level normally experienced in the busy hour, consumers may be affected by issues such as videos buffering, gameplay becoming disrupted, data taking a long time to connect, or being unable to connect to the network at all. In some cases ISPs 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 last five years has been fairly consistent and generally they expect to invest at similar levels in the next few years.

3.47 In addition, content providers are taking action to help deliver traffic more efficiently. They have invested in their own or used 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 have also sought to co-ordinate and explain their content distribution plans with the ISPs (see Section 11 for further details).

3.48 For a more detailed discussion of underlying traffic trends, please see Section 6 and Annex 3.

Future market trends

3.49 We have considered how the internet might evolve, what services may arise, and how this might impact on networks in the future.

3.50 Content providers 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.⁸⁷ 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.

3.51 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.⁸⁸

3.52 In the future, the internet could develop in different ways. For example, consumers may connect to networks on the move via new wearable devices which help support a new range

⁸⁶ Latency is a measure of how long the content takes to be delivered from the server to the end-user's device. Jitter is a measure of the variation in latency. Increased latency or jitter can make services slow to load or be inconsistent in performance, and could be particularly disruptive to delay sensitive content such as online gaming. Packet loss means some data does not get passed through the network. This could cause voice or video calls to be broken up. It can also result in the calls "freezing up" making the service un-useable.

⁸⁷ 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.

⁸⁸ '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.

of services (such as preventative healthcare applications).⁸⁹ 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. The development of new technologies based on Artificial Intelligence (AI) may also drive the way the internet develops.

- 3.53 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.

⁸⁹ 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 to assessing the effectiveness of the net neutrality framework

Introduction

- 4.1 This section sets out the overall approach to assessing the effectiveness of the net neutrality framework that we have taken in this review:
- we first set out the 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;
 - we identify potential concerns related to the application of the current net neutrality framework; and
 - finally, we outline how we carried out our assessment of specific aspects of the net neutrality framework in coming to the decisions we have made in this document.

Policy objectives relevant to the review

- 4.2 Our review of the net neutrality framework focused on three core policy objectives and the positive market outcomes we want 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 to 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) content providers 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) content providers 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 consumer needs and to support innovation in online services, both today and in the future.

4.3 The first two objectives reflect the objectives underpinning the net neutrality rules. In addition, we consider that successfully delivering 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. These objectives are interlinked and our policies need to perform an important balancing function. This includes, for example, ensuring that regulation does not inadvertently undermine network efficiency and robustness, which could put the infrastructure that an open internet and innovation depend upon at risk.

What concerns does the net neutrality framework seek to address?

4.4 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. This section is intended to provide context for our assessment of specific aspects of the net neutrality framework set out in Sections 5 to 12.

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

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

4.6 It is ISPs, as providers of connectivity services, that connect content providers 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 the ISP's connectivity services to access content online. Therefore, ISPs can be considered to hold a 'gatekeeper' position over the customers who have subscribed to their services.

4.7 ISPs' gatekeeper positions can result in them being able to exercise market power over content providers.⁹⁰ Consumers typically subscribe to a single ISP over a period of time. Every ISP therefore provides a unique route for content providers to reach an ISP's customers over that period of time and content providers require access to multiple ISPs to

⁹⁰ 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.

reach end users widely. The larger an ISP's customer base is, the more important the ISP becomes as a conduit for content providers to reach consumers, and therefore the more likely the ISP is to have a degree of market power over them.⁹¹

- 4.8 Consumers typically subscribe to both a fixed ISP and a mobile ISP,⁹² and in principle content providers can reach consumers through either channel. In practice, however, distributing content via every fixed and mobile ISP is likely to be essential because fixed and mobile connectivity tend to serve different consumer needs.⁹³ Content providers 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.⁹⁴
- 4.9 In the absence of the net neutrality rules, ISPs could in principle exploit market power over content providers. For example, ISPs could charge them excessive fees for access to their customers, and they could block or throttle access to the online services of content providers that are unable or unwilling to pay. Moreover, ISPs may have an incentive to discriminate between different content providers, 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 content providers (especially smaller content providers) to reach consumers. The potential for ISPs to exploit such market power therefore risks harming outcomes for consumers and citizens and undermining innovation by content providers.
- 4.10 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 content providers for such access), as explained in Section 2. In doing so, they limit the ability of ISPs to exploit any market power they may have over content providers.
- 4.11 As identified in Section 3, there are some very large content providers that have emerged in the last decade who are likely to be able to constrain ISPs to some degree. The most notable examples 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 content providers can potentially use their strong bargaining power to protect themselves from being exploited by ISPs. However, such competitive dynamics between the ISPs and large content providers would not benefit smaller content providers, which do not have the same degree of bargaining power. Therefore, we consider that the potential for ISPs to exercise market power remains a valid concern, at least, in respect of smaller content providers whose ability to distribute content and to innovate is an important feature of the open internet.⁹⁵

⁹¹ Some larger content providers can have countervailing bargaining power over the ISPs, as discussed below.

⁹² See Annex 5. The vast majority of households in the UK have access to both a fixed and mobile connection. According to Ofcom's 2023 TechTracker, 94% of households have fixed broadband internet access. 92% of adults have access to a smartphone with a 4G or 5G connection.

⁹³ Fixed is better suited to high volume and quality-sensitive content while mobile is better suited to use on-the-go.

⁹⁴ For example, when users request certain content via their mobile ISP, the content provider cannot deliver that content via the users' fixed ISP as an alternative.

⁹⁵ We consider the potential differential impacts of liberalising aspects of the rules on smaller as opposed to larger content providers in Section 5 below on zero-rating and Section 11 on charging for access to the network.

4.12 In addition, we are aware that there are other gatekeepers alongside the ISPs in the internet ecosystem.⁹⁶ 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 content providers 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 as noted in Section 2. 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, we have considered that it is appropriate to have regard to how the internet ecosystem is functioning as a whole in coming to our decisions.

The net neutrality rules also address other barriers for content providers

4.13 While a significant proportion of traffic on the internet is driven by a limited number of large content providers, there is a very long tail of smaller content providers. Competition, innovation and ultimately good outcomes for consumers and citizens are supported by all content providers being able to access the widest possible market and set of end-users. Any barriers or frictions content providers face in this regard could be harmful, particularly content providers who are smaller in terms of scale or resources.

4.14 Such barriers could exist regardless of whether ISPs have market power over content providers. For example, if content providers were required to agree with ISPs to deliver online services to their customers through some form of negotiation, contract or registration, this could deter at least some of the long tail of content providers from accessing end-users. In particular, smaller content providers would be put at a disadvantage relative to larger content providers, 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 content providers' ability to distribute their content to consumers and citizens widely.

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

4.16 A lack of information for consumers or poor transparency (i.e. information asymmetry) may mean competition alone does not deliver good outcomes for citizens and consumers.⁹⁷

⁹⁶ See Section 3.

⁹⁷ 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 differences between the information available to consumers and internet service providers.

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 whether they favoured certain content providers 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.

- 4.17 Opaque and complex information undermines consumer choice. There is a risk that without the right information consumers do not choose the ISP or internet service that best meets their needs and budget, potentially hindering their ability to access online content. This would run counter to the objective of safeguarding an open internet. The net neutrality rules aim to prevent such outcomes by ensuring that content providers are treated equally and that appropriate information is made available to consumers.⁹⁸

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

The framework has delivered protections to content providers to date

- 4.18 Since the net neutrality framework was introduced in 2016, it has supported consumer and citizen choice of content as well as ensuring that content providers 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 content providers, or of ISPs determining which content providers should succeed in any given market segment. In line with this, stakeholders' responses to our 2021 Call for Evidence and 2022 Consultation, as well as responses to our RFIs, broadly confirm that content providers 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 content providers and consumers and citizens in order to safeguard an open internet and facilitate innovation.

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

- 4.19 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 content providers and as gatekeepers elsewhere along the value chain; and the demand for data traffic and quality of service is expected to grow significantly.

⁹⁸ 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.

- 4.20 These developments have led to competing views on the effectiveness of the net neutrality framework. ISPs argue the rules mean that content providers have reduced incentives to make efficient use of networks, higher costs must be recovered through higher charges to retail customers, they have a reduced ability to recover future investment costs required to meet expected traffic growth, and as such have lower incentives to invest or offer innovative services.
- 4.21 Conversely, content providers 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.
- 4.22 In order to meet our objectives, our review aims to ensure that the net neutrality framework reflects industry developments and continues to protect content providers 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 content providers;
 - traffic management to ensure efficient operation of and investment in networks; and
 - charging content providers 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

- 4.23 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 has considered the merits and possible adverse impacts of adopting a more flexible approach.
- 4.24 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 explain our decisions on zero-rating in Section 5.
 - Offering retail products with different quality levels, such as on latency, jitter or packet loss. We explain our decisions on differentiated retail offers in Section 7.
 - We have also assessed several other aspects of the net neutrality framework, where there have been concerns that the net neutrality rules, or uncertainty about the interpretation of the rules, may be preventing ISPs or content providers 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 explain our decisions on these issues in Section 8.

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

- 4.25 The current net neutrality framework applies to general, publicly-available internet access services. As explained in Section 2, 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. 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.
- 4.26 Recent technological advances in communications have generated greater demand from a broader range of services which might benefit from such optimisation, as noted above in Section 3. ISPs have 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.
- 4.27 We set out our decisions on the role of specialised services in Section 10.

Traffic management to ensure efficient operation of and investment in networks

- 4.28 As noted, 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 investment, it is also important that we ensure that the net neutrality framework does not hinder efficient operation of and investment in networks.
- 4.29 ISPs and content providers 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 content providers 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 content providers told us that they take active steps to deliver traffic more efficiently and invest in infrastructure to deliver traffic to ISPs.
- 4.30 Our decisions on traffic management relating to the impact of the current net neutrality framework on ISPs’ scope to run their networks in an efficient and robust manner are set out in Section 6.

Charging content providers for carrying or prioritising general internet access traffic

- 4.31 We set out our position in relation to charging regimes under the net neutrality framework in Section 11, focussing on the impact on consumers of allowing ISPs to charge content providers, and provide further detailed discussion of the underlying issues in Annex 4.

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

- 4.32 Sections 5 to 11 of the document assess specific areas of the net neutrality framework, namely zero-rating, traffic management, ISPs charging content providers, specialised services, and scope and exceptions. In each section, we set out:
- our consultation proposals;
 - responses from stakeholders to the 2022 Consultation;
 - our analysis and decisions; and
 - where relevant, areas where we have considered the case for legislative change.

5. Zero-rating

Introduction

- 5.1 In this section, we present our analysis and conclusions on zero-rating offers.
- 5.2 In summary, we have concluded that zero-rating offers largely benefit consumers, although in limited circumstances they may reduce consumer choice. We also conclude that our 2019 Framework for assessing zero-rating offers needs to be updated and simplified to provide greater clarity to ISPs.⁹⁹
- 5.3 We have therefore decided to replace our 2019 Framework on zero-rating with new guidance, setting out that we will continue to take a case-by-case approach to assessment, while clarifying that we are only likely to have concerns in limited circumstances. In particular, we set out the circumstances in which we are unlikely to have concerns:
- zero-rated access to information and services from public sector organisations (e.g. Government, NHS), charities or non-governmental organisations (NGOs) that provide a social benefit and are not in competition with other suppliers; and
 - zero-rating offers that are genuinely open to all content providers of a class of content to join (“class-based offers”) – a class is a grouping of content providers providing similar content, such as video streaming content, audio streaming content or social media.
- 5.4 For all other zero-rating offers, we set out a revised framework against which we will assess them when required. We also outline our approach to zero-rating when a customer’s general data allowance has expired.
- 5.5 It is important that ISPs provide consumers with sufficient transparency about their zero-rating offers. It is also important that we have sufficient information and data that allows us to monitor zero-rating offers. Therefore, we set out how ISPs should meet their obligations to provide sufficient information to consumers and clarify our approach to monitoring.
- 5.6 Our new guidance setting out our updated approach is in Annex 1.
- 5.7 This section is structured as follows:
- we first outline the regulatory framework on zero-rating;
 - we then outline our proposals relating to zero-rating offers that were set out in our 2022 Consultation and summarise stakeholder responses to those proposals;
 - finally, we provide our analysis (including our response to stakeholder comments) and decisions.

⁹⁹ As explained in more detail below, we published a framework for assessing zero-rating offers in 2019. Ofcom, 2019. [Ofcom's approach to assessing compliance with net neutrality rules](#) (‘the 2019 Framework document’), Section 3.

Background

Zero-rating and the net neutrality rules

- 5.8 Zero-rating is a commercial practice whereby an ISP does not subtract data usage associated with particular content or a class of content from a customer's data allowance.¹⁰⁰ This means that the customer can access the zero-rated content without it counting towards their general data allowance. Zero-rating tends to be a feature of mobile markets, where unlimited data packages are not as universal as for fixed broadband. Our analysis in this section has therefore focused on the UK mobile market.
- 5.9 While zero-rating can provide benefits to consumers, if a zero-rating offer has a strong influence on consumer behaviour to favour zero-rated content, it may distort competition between content providers. In some circumstances therefore zero-rating practices could potentially reduce consumer choice, undermine the open internet and limit the ability for smaller content providers to innovate in the long term.
- 5.10 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.¹⁰¹ While the rules do not explicitly refer to the practice of zero-rating, assessment of these types of offers have previously taken into account:
- 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).¹⁰²
- 5.11 Previous versions of the BEREC Guidelines have set out the types of factors that NRAs should consider when assessing zero-rating offers¹⁰³ and we took these into account when creating the 2019 Framework¹⁰⁴ and our updated guidance.¹⁰⁵

¹⁰⁰ When we refer to content in this section, this includes information, services and applications provided over the internet.

¹⁰¹ 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.

¹⁰² 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 5.113 to 5.126.

¹⁰³ 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.

¹⁰⁴ The 2019 Framework document, Section 3.

¹⁰⁵ As explained in Section 13, given that we no longer have to take utmost account of the BEREC Guidelines, we have decided to produce our own consolidated guidance to replace BEREC's version.

Our approach in the 2019 Framework document

- 5.12 Since 2016, we have assessed zero-rating offers on a case-by-case basis as necessary. We published the 2019 Framework document outlining our approach to assessing compliance with the net neutrality rules, including a three-step framework for assessing zero-rating offers.¹⁰⁶
- 5.13 We have used this three-step 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 their rights; and
 - **Step 3** asks whether the offer or commercial practice could potentially materially restrict or adversely affect end-user choice in practice.
- 5.14 Under Step 3, the 2019 Framework document identified five questions we would consider when assessing whether a zero-rating offer has materially affected user choice:¹⁰⁷
- the market positions of the relevant ISPs and content providers;
 - 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
 - the extent to which the offer seeks to circumvent the goals of the net neutrality rules.
- 5.15 In the 2019 Framework document, we encouraged ISPs to use this approach to assess any zero-rating offers they were considering bringing to market.

European Court rulings and 2022 BEREC Guidance

- 5.16 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 of traffic in Article 3(3) of the net neutrality rules.¹⁰⁸ BEREC subsequently revised its Guidelines in June 2022 to reflect these rulings and explained that zero-rating of specific content providers 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).¹⁰⁹

¹⁰⁶ The 2019 Framework document, Section 3. Although published in 2019, the framework had been developed by Ofcom since we began our enforcement of the Regulation in 2016.

¹⁰⁷ In the 2019 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.

¹⁰⁸ Cases C 34/20 – *Telekom Deutschland v Germany*, C-854/19 – *Vodafone v Germany* and C-5/20 – *Bundersverband v Vodafone*. For a summary of the rulings, see the CJEU press release, ['Zero tariff' options are contrary to the regulation on open internet access](#), September 2021 [accessed 19 October 2023].

¹⁰⁹ 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.

5.17 CJEU rulings made 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. In addition, we are no longer required to take utmost account of the BEREC Guidelines, but we can continue to have regard to them where we consider this to be appropriate. We discuss these CJEU rulings and the BEREC Guidelines further in paragraphs 5.61 to 5.64.

Our 2022 Consultation

5.18 In our 2022 Consultation, we provisionally concluded that zero-rating offers are generally beneficial to consumers, although we recognised that in some limited circumstances they may reduce consumer choice. We therefore proposed to continue with our approach of assessing zero-rating offers on a case-by-case basis, but to revise our guidance and clarify that we will generally allow these offers, while setting out the limited circumstances where we may have concerns.

5.19 More specifically, we proposed to define three types of zero-rating offers based on the likelihood that each will result in concerns:

- **‘Type One’ offers** would be 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. We proposed that once we are satisfied that an offer is a Type One zero-rating offer, we would be unlikely to consider it any further.
- **‘Type Two’ offers** would be offers that are genuinely open to all content providers of a particular class. We proposed that once we are satisfied that an offer is a Type Two zero-rating offer, we would be unlikely to consider it any further.
- **‘Type Three’ offers** would be all other offers that do not meet either the Type One or Type Two criteria. We said we would continue to monitor and review such offers, where 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.

Our proposed approach to zero-rating offers when the general data allowance has expired

5.20 In addition, we set out our provisional view that, in principle, there could be benefits to allowing zero-rated access once a customer’s data allowance has been exhausted. We also acknowledged that in cases where there were concerns about such offers our proposed framework would be likely to identify them, if we were to apply it in such instances.

5.21 However, the net neutrality rules prohibit ISPs from continuing to zero-rate content once the customer’s data cap is reached. We proposed to clarify in our updated guidance that these offers would not be allowed, but also make it clear that we would be unlikely to have concerns where the zero-rated content that can still be accessed is limited to:

- access to the ISP’s own website or application in order for a user to top-up their data allowance; or
- access to Type One content and emergency communications.

Stakeholder responses

Our preliminary view on zero-rating and our proposed approach to assessment

- 5.22 Stakeholders broadly agreed with our proposed approach to assessing zero-rating offers, including our proposals for each type of offer. In particular, they welcomed more clarity on (i) how we will assess zero-rating offers; (ii) our proposal to continue to take a case-by-case approach to assessment, while clarifying that we are only likely to have concerns in limited circumstances; and (iii) our view that we are generally unlikely to have concerns about Type One and Type Two offers. However, stakeholders also raised several issues and suggestions regarding specific aspects of our proposals, particularly around the clarity of our assessment process and practicalities of zero-rating, which are set out below.
- 5.23 Some stakeholders expressed support for our view that zero-rating offers are generally beneficial to consumers. For example, several stakeholders highlighted that they can improve consumers' access to content which provides social benefits, such as health and debt relief information. A number of stakeholders also noted that it can support connectivity for consumers, particularly those on a low income, and can boost competition in the mobile market. Two stakeholders ([S&C] and the BBC) expressed agreement with our assessment that zero-rating offers have the potential, in certain circumstances, to adversely affect competition between content providers.¹¹⁰
- 5.24 The Internet Society opposed zero-rating offers in general and our proposed approach to such offers, on the basis that they generally result in negative outcomes, including undermining the open internet and distorting competition. It supported the CJEU's interpretation of zero-rating offers and BEREC's revised Guidelines, agreeing with the CJEU's interpretation of such offers as violating net neutrality and EU law.¹¹¹ Similarly, [S&C] opposed zero-rating generally and our approach to Type Two and Type Three offers, although it was sympathetic to allowing ISPs to zero-rate socially beneficial content from public sector bodies.¹¹²
- 5.25 Amazon and Google stressed the importance of transparency between ISPs, content providers and consumers for zero-rating offers. In addition, Amazon felt that ISPs should be required to make the terms and conditions of their zero-rating offers publicly available, not just to those participating in offers, so that content providers know if the terms and conditions are fair or not.¹¹³ On a similar note, Google and techUK raised concerns that non-zero-rated, third-party content embedded within zero-rated websites (e.g. embedded YouTube videos on an NHS webpage) may mislead consumers, as they may wrongly think that this content is also zero-rated.¹¹⁴ techUK recommended that details of Type Three offers should be made public by the ISPs offering them, to ensure that content providers can decide whether the deal is fair.¹¹⁵

¹¹⁰ [S&C] response to the 2022 Consultation, pp. 1-2; [the BBC response](#) to the 2022 Consultation, para. 35.

¹¹¹ [The Internet Society response](#) to the 2022 Consultation, pp. 1-2.

¹¹² [S&C] response to the 2022 Consultation, pp. 1-2.

¹¹³ [Google response](#) to the 2022 Consultation, pp. 8-9; [Amazon response](#) to the 2022 Consultation, p. 6.

¹¹⁴ [Google response](#) to the 2022 Consultation, p. 8; [techUK response](#) to the 2022 Consultation, p. 2.

¹¹⁵ [techUK response](#) to the 2022 Consultation, p. 4.

- 5.26 Strand Consult UK felt that while zero-rating is beneficial to consumers and citizens, it is not something we should regulate, adding that the term is not mentioned in UK law.¹¹⁶ Relatedly, Three argued that Ofcom should recommend to Government the repeal of the net neutrality rules on zero-rating, and that we should only intervene when consumer harm occurs.¹¹⁷
- 5.27 A stakeholder ([redacted]) felt that categorisation of zero-rating offers into different types may be a contentious issue.¹¹⁸ Similarly, a stakeholder ([redacted]) argued that classifying zero-rating offers into different types would be burdensome and added unnecessary complexity.¹¹⁹

Our proposals for Type One offers – beneficial content from public bodies with no competitors

- 5.28 Three stakeholders (Disruptive Analysis, techUK and Vodafone) suggested expanding Type One offers to include certain other organisations, including charities, not-for-profits and those endorsed or contracted to the public sector.¹²⁰
- 5.29 Disruptive Analysis suggested that consideration be given to the scenario where Government sites use cloud-based services (such as services for identity-verification or medical image diagnostics inside a tax or medical application).¹²¹

Our proposals for Type Two offers – open zero-rating offers

- 5.30 Some stakeholders raised issues around the technical, legal and contractual requirements for Type Two zero-rating offers:
- BT Group sought additional clarity on what providing a ‘genuinely open’ offer without undue requirements means in practice.¹²²
 - One stakeholder ([redacted]) argued that ISPs should permit content providers to join class-based offers upon request without requiring any commercial or technical onboarding.¹²³
 - The Internet Society and Open Rights Group (ORG) noted that technical requirements for Type Two offers may make it challenging for certain smaller content providers to join, thus potentially negatively impacting competition and consumer choice.¹²⁴
 - The ORG raised that federated social media services, such as those hosted on Mastodon,¹²⁵ would find it hard to have their traffic identified in order to participate in zero-rating offers. The ORG was concerned how such decentralised, interoperable social media would be impacted.¹²⁶

¹¹⁶ [Strand Consult UK response](#) to the 2022 Consultation, p. 1.

¹¹⁷ [Three response](#) to the 2022 Consultation, pp. 45-46.

¹¹⁸ [redacted] response to the 2022 Consultation, p. 2.

¹¹⁹ [redacted] response to the 2022 Consultation, p. 40.

¹²⁰ [Disruptive Analysis response](#) to the 2022 Consultation, p. 1; [techUK response](#) to the 2022 Consultation, p. 2; [Vodafone response](#) to the 2022 Consultation, p. 5.

¹²¹ [Disruptive Analysis response](#) to the 2022 Consultation, p. 1.

¹²² [BT Group response](#) to the 2022 Consultation, para. 9.

¹²³ [redacted] response to the 2022 Consultation, p. 1.

¹²⁴ [The Internet Society response](#) to the 2022 Consultation, p. 2; [the ORG response](#) to the 2022 Consultation, pp. 1.

¹²⁵ Mastodon is free and open-source software for running self-hosted social networking services.

¹²⁶ [The ORG response](#) to the 2022 Consultation, pp. 1-2.

- The BBC and Disruptive Analysis observed that as encryption increases it will be more difficult for ISPs to identify where traffic originates from, making zero-rating technically challenging.¹²⁷
- 5.31 The Internet Society, Disruptive Analysis and techUK noted the challenges of classifying multi-functional services (for example, some content providers offer video and audio streaming services as well as gaming).¹²⁸ Similarly, the Digital Connectivity Forum (DCF) and techUK sought further clarification on how classes of services for Type Two offers would be assessed.¹²⁹
- 5.32 Amazon considered that it was not entirely clear whether payments were allowed under Type Two offers. Amazon also opposed payments to ISPs for zero-rating offers (particularly for Type Two), alongside two other stakeholders ([§<] and [§<]), which it argued may affect competition in the market.¹³⁰
- 5.33 The Comms Council UK suggested that we should specify timescales for ISPs to respond to requests to join zero-rating offers.¹³¹

Our proposals for Type Three offers – other zero-rating offers

- 5.34 Some stakeholders suggested that assessments of Type Three offers should not only concern zero-rating arrangements, but also the wider competitive and commercial context. For example, the BBC and the Federation of Communication Services (FCS) were specifically concerned about vertically-integrated ISP- content providers using zero-rating to gain a dominant market position or entrench their market position, potentially making it harder for smaller content providers to compete effectively. Further, the BBC raised that (i) even short-term zero-rating offers could allow a content provider to gain a competitive advantage; and (ii) assessments should include consideration of any other offers or arrangements the content provider is included in.¹³² [§<] considered that zero-rating can distort competition between content providers, adding that it can encourage ISPs to ‘rebalance’ their data packages thereby reducing the data available for general usage.¹³³
- 5.35 Virgin Media O2, Three and another stakeholder ([§<]) were concerned with the impact of regulation on innovation, with the latter adding that innovative ideas should be given the greatest benefit of the doubt. Virgin Media O2 and Three argued that the risk of enforcement action discourages ISPs from introducing new, beneficial offers. Virgin Media O2 felt that this issue was compounded by our Type Three framework, which it considered subjective and vague. It also argued that Ofcom should adopt a more permissive approach to assessment of Type Three offers, intervening only in exceptional circumstances.¹³⁴

¹²⁷ [The BBC response](#) to the 2022 Consultation, para. 43; [Disruptive Analysis response](#) to the 2022 Consultation, pp. 1-2.

¹²⁸ [techUK response](#) to the 2022 Consultation, p. 3; [Disruptive Analysis response](#) to the 2022 Consultation, p. 1; [the Internet Society response](#) to the 2022 Consultation, pp. 1-2.

¹²⁹ [The DCF response](#) to the 2022 Consultation, p. 2; [techUK response](#) to the 2022 Consultation, p. 3.

¹³⁰ [Amazon response](#) to the 2022 Consultation, p. 5; [§<] response to the 2022 Consultation, p. 2; [§<] response to the 2022 Consultation, p. 1.

¹³¹ [The Comms Council UK response](#) to the 2022 Consultation, p. 1.

¹³² [The BBC response](#) to the 2022 Consultation, para. 40-42; [the FCS response](#) to the 2022 Consultation, p. 2.

¹³³ [§<] response to the 2022 Consultation, pp. 1-2.

¹³⁴ [Virgin Media O2 response](#) to the 2022 Consultation, pp. 18-19; [Three response](#) to the 2022 Consultation, p. 46; [§<] response to the 2022 Consultation, p. 3.

- 5.36 Amazon and Meta noted that zero-rating offers should not be a concern just because they may influence consumer behaviour or because the offers are longer term. For Amazon, concerns should be based on consumer harm (i.e. harm to competition and therefore consumer choice). Further, Meta pointed out that (i) we should take a broad view of benefits to citizens when assessing Type Three offers, including the benefits connectivity brings, particularly to low-income consumers; and (ii) data scarcity is not a clear indicator that zero-rating should cause concern.¹³⁵

Our proposed approach to zero-rated access once a data allowance has been exhausted

- 5.37 Many stakeholders welcomed our proposed approach to zero-rated access past a customer's data allowance. A stakeholder ([S&C]) and the ORG agreed with our proposal to make it clear in our guidance that we are unlikely to have concerns where ISPs zero-rate access to Type One content after a data allowance has been exhausted.¹³⁶
- 5.38 Some stakeholders felt that more zero-rated content should be able to be accessed once a customer's data allowance has been used up. Disruptive Analysis suggested that it could be allowed up to a certain percentage or multiple of the customer's data allowance.¹³⁷ The FCS emphasised that access should be permitted to some types of content and that each offer should be assessed on a case-by-case basis.¹³⁸ Meta and techUK thought that we should expand the list of circumstances where we would be unlikely to have concerns about zero-rated access past the data allowance. Specifically, it was suggested that more services are added to the list and that we allow zero-rating for a period to support connectivity, particularly for low-income consumers.¹³⁹ BT Group and the Competitive Enterprise Institute called for legislative change to allow ISPs greater flexibility in this area.¹⁴⁰
- 5.39 Three stakeholders (Netflix, the ORG and [S&C]) were opposed to the notion of generally allowing zero-rated access to continue once a customer's data allowance has been exceeded.¹⁴¹ The BBC specifically said that it did not think that legislative change was required.¹⁴²

Our proposed approach to monitoring

- 5.40 The FCS suggested that we change our guidance from 'we *may* gather this information' (zero-rating data) to 'we *will* gather this information' (emphasis added). It also thought that each proposed zero-rating offer should be thoroughly assessed by Ofcom.¹⁴³ Moreover,

¹³⁵ [Amazon response](#) to the 2022 Consultation, p. 6; [Meta response](#) to the 2022 Consultation, pp. 7-8.

¹³⁶ [S&C] response to the 2022 Consultation, p. 2; [the ORG response](#) to the 2022 Consultation, p. 2.

¹³⁷ [Disruptive Analysis response](#) to the 2022 Consultation, p. 2.

¹³⁸ [The FCS response](#) to the 2022 Consultation, p. 2.

¹³⁹ [Meta's response](#) to the 2022 Consultation, pp. 8-9; [techUK response](#) to the 2022 Consultation, pp. 5-6.

¹⁴⁰ [BT Group response](#) to the 2022 Consultation, para. 32-33; [the Competitive Enterprise Institute response](#) to the 2022 Consultation, p. 5.

¹⁴¹ [Netflix response](#) to the 2022 Consultation, p. 2; [the ORG response](#) to the 2022 Consultation, p. 2; [S&C] response to the 2022 Consultation, p. 2.

¹⁴² [The BBC response](#) to the 2022 Consultation, para. 44.

¹⁴³ [The FCS response](#) to the 2022 Consultation, p. 2.

Google suggested regularly monitor ISPs' behaviour regarding zero-rating to make sure they are complying with the rules.¹⁴⁴

Our analysis and conclusions

5.41 In this sub-section, we consider the outcomes delivered by zero-rating and our approach to assessing zero-rating offers to date and examine, where relevant, how these align with our overarching policy objectives to safeguard: (i) citizens' and consumers' access to the open internet; (ii) the open internet as an engine of innovation; and (iii) well-run, efficient and robust networks. Firstly, we assess the impact that zero-rating offers have on citizens and consumers, with due regard to the market context. We then evaluate our 2019 Framework for reviewing such offers, including our case-by-case approach to assessment. Finally, we set out our decisions on our approach to zero-rating offers and our guidance for assessing them. In doing so, we take into consideration stakeholders' comments in response to our 2022 Consultation and further information we have gathered from stakeholders since that consultation.

Our view of zero-rating

Current use of zero-rating

Take up and availability of commercial zero-rating offers

5.42 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 2023, 17% of customers had a mobile contract that provided zero-rated access to certain commercial content, which is down from 19% for the start of 2022.^{145 146} In recent years, some major mobile providers have withdrawn commercial zero-rating offers. For example, O2 no longer offers its "unlimited music streaming" service,¹⁴⁷ Three has withdrawn its Go Binge product for new customers,¹⁴⁸ while Vodafone has also removed its zero-rated 'Vodafone Pass' and now only offers zero-rated access to commercial content under its VOXI brand.¹⁴⁹

Data allowance and data usage in the UK

5.43 The 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. The

¹⁴⁴ [Google response](#) to the 2022 Consultation, p. 8.

¹⁴⁵ This is 17% of their customers who have any type of mobile contract (including those with unlimited data or no data) that provide zero-rated access to commercial content, which is mostly social media, video streaming or audio streaming content. This 17% 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.

¹⁴⁶ Ofcom analysis based on: BT Group response to the RFI dated 22 March 2022 and 20 March 2023; Three response to the RFI dated 22 March 2022 and 20 March 2023; Sky Response to the RFI dated 22 March 2022 and 20 March 2023; Virgin Media O2 response to the RFI dated 22 March 2022 and 20 March 2023; and Vodafone Response to the RFI dated 22 March 2022 and 20 March 2023.

¹⁴⁷ See the 2019 Framework document, para. 3.27 to 3.28. While the offer was not strictly zero-rating, it was advertised as unlimited streaming.

¹⁴⁸ Three website. [All about Go Binge](#) [accessed 19 October 2023].

¹⁴⁹ Vodafone website. [What are Vodafone Passes?](#) [accessed 19 October 2023].

number of mobile customers with unlimited data (who would have no need for zero-rating offers) has increased from 5% in January 2019 to 18% in January 2023.¹⁵⁰

- 5.44 Data allowances in general are also 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 to 55% in 2023.¹⁵¹ Furthermore, most customers do not come close to exhausting their data allowance, although customers have used a greater proportion of their data allowance more recently. As of January 2023, 80% of consumers (excluding those with unlimited data) used less than half their monthly data, the same as in January 2022, and only 8% of customers used more than 90% of their data allowance as of January 2022. This figure rose slightly to 10% in 2023.¹⁵²
- 5.45 Taken together, the decreasing popularity of commercial zero-rating offers and customers' increasing data allowances indicate that zero-rating of commercial content is declining in importance in the market, both for customers and ISPs.

Zero-rated access to non-commercial services

- 5.46 In contrast to the limited take-up and availability of tariffs with zero-rated access to commercial services, ISPs have zero-rated more non-commercial content in recent years. For example, during the Covid-19 pandemic all major mobile providers offered zero-rated access to websites supporting victims of crime, as part of a UK Government coordinated initiative.¹⁵³ The major mobile providers also provided zero-rated access to the educational website Oak National Academy during the pandemic.¹⁵⁴ Data we have gathered recently from the largest UK mobile providers indicates that they have continued to zero-rate some non-commercial content for all their customers; however, the extent of the practice varies between providers.¹⁵⁵

Potential benefits of zero-rating

Increased data usage and certainty

- 5.47 Zero-rating offers can help customers stay connected to the internet.¹⁵⁶ Such offers not only give consumers unlimited access to the content that is being zero-rated, but they also free

¹⁵⁰ Ofcom analysis based on: BT Group response to the RFI dated 22 March 2022 and 20 March 2023; Three response to the RFI dated 22 March 2022 and 20 March 2023; Sky Response to the RFI dated 22 March 2022 and 20 March 2023; Virgin Media O2 response to the RFI dated 22 March 2022 and 20 March 2023; and Vodafone Response to the RFI dated 22 March 2022 and 20 March 2023.

¹⁵¹ These figures are calculated as proportion of customers who have more than 10GB of data allowance (not including 10 GB) out of all customers. Similarly, 46% of customers in 2023 have more than 20GB of data allowance per month.

¹⁵² Ofcom analysis based on: BT Group response to the RFI dated 22 March 2022 and 20 March 2023; Three response to the RFI dated 22 March 2022 and 20 March 2023; Sky Response to the RFI dated 22 March 2022 and 20 March 2023; Virgin Media O2 response to the RFI dated 22 March 2022 and 20 March 2023; and Vodafone Response to the RFI dated 22 March 2022 and 20 March 2023.

¹⁵³ UK Government website, 2020. [Data charges removed for websites supporting victims of crime](#) [accessed 19 October 2023].

¹⁵⁴ Mobile UK, 2021. [Mobile Operators Extend Educational Assistance by Zero-Rating Oak National Academy Website](#) [accessed 19 October 2023].

¹⁵⁵ Ofcom analysis based on: BT Group response to the RFI dated 20 March 2023; Three response to the RFI dated 20 March 2023; Sky Response to the RFI dated 20 March 2023; Virgin Media O2 response to the RFI dated 20 March 2023; and Vodafone Response to the RFI dated 20 March 2023.

¹⁵⁶ A number of stakeholders made this point in response to our 2022 Consultation.

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 also provide greater reassurance and certainty that they will not exceed their allowance.

Greater choice of products for consumers

- 5.48 Along with variations in data allowance, minutes, coverage and speed, zero-rating offers give ISPs another way to tailor retail products to meet different consumer preferences. This can give ISPs more flexibility to innovate with differentiated retail products that provide consumers with greater choice and favourable access to the content that they value the most.
- 5.49 This can also increase competition between ISPs.¹⁵⁷ 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 have provided 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 larger mobile providers (whose flagship brands do not generally zero-rate commercial content for all their customers).¹⁵⁸

Facilitating content provider innovation and competition

- 5.50 Zero-rating offers could potentially help content providers to expand and challenge incumbents. For example, a content provider could partner with an ISP to promote an emerging or 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.

Wider social benefits to citizens and consumers

- 5.51 Zero-rating offers can also be used to ensure access to content that provides wider social benefits to citizens and consumers.¹⁵⁹ For example, last year several mobile providers expanded their list of zero-rated websites that offer help and advice to those likely to experience financial hardship.¹⁶⁰ These types of offers are beneficial to consumers, as they are less likely to be deterred from accessing useful resources if they have limited monthly data allowances. This can be particularly beneficial for low-income consumers who are more likely to rely on mobile data for internet access.¹⁶¹

¹⁵⁷ A number of stakeholders pointed this out in response to our 2022 Consultation.

¹⁵⁸ For examples, see the [Sky Mobile website](#) (Sky Mobile zero-rates several Sky-owned apps); and the [VOXI website](#) (VOXI zero-rates several social media apps) [accessed 19 October 2023].

¹⁵⁹ This was noted by several stakeholders in their responses to our Consultation.

¹⁶⁰ Three website, September 2022, [Three UK expands number of zero-rated websites to further support customers during cost-of-living crisis](#); and Virgin Media O2 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 19 October 2023]. In addition, as detailed above, during the Covid-19 pandemic the largest mobile providers agreed with Government to provide customers with zero-rated access to websites supporting victims of crime.

¹⁶¹ 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](#), para. 3.21.

Potential adverse effects of zero-rating

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

- 5.52 Zero-rating offers have the potential to make it difficult for content providers to compete effectively, deter market entry and/or limit investment in innovative services.¹⁶² This could in turn have the effect of reducing consumer choice of content providers and services, thereby limiting end-user rights under Article 3 of the Regulation and undermining the open internet. Importantly, however, this would only occur under certain circumstances.
- 5.53 This is more likely where an offer has all of the following features:¹⁶³
- **content providers are effectively excluded from the offer** – i.e. if any rival content providers are effectively unable to participate in the zero-rating offer;
 - **it is important for a content provider to be zero-rated to compete effectively** – i.e. a zero-rating offer is available to a sufficient number of consumers and the content provider service is data-intensive, such that the zero-rating offer could have a material impact on how content providers compete with each other;
 - **the offer is likely to influence consumer behaviour** – such that a zero-rating offer is successful in inducing consumers to use zero-rated content providers as alternatives to non-zero-rated content providers; and
 - **the content provider being zero-rated has a degree of market power** – so that it is more likely to be able to use the zero-rating offer to undermine smaller content providers' ability to compete effectively, thereby entrenching their market position.
- 5.54 A harmful outcome for consumers can only occur if the zero-rated content provider has existing or potential competitors who would 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 services¹⁶⁴), then the zero-rating offer would not harm the ability of any other content provider to compete.

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

- 5.55 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 one or more content providers (so other ISPs cannot zero-rate the content provider) and consumers thought at least one of the content providers 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 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).

¹⁶² A number of stakeholders raised these issues in their response.

¹⁶³ We provide more explanation below about why each of these elements are relevant when setting out our framework for Type Three zero-rating offers.

¹⁶⁴ 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.

5.56 However, we consider that this is unlikely in current circumstances given that competition in the UK retail mobile market¹⁶⁵ continues to be generally effective and that the importance of zero-rating for consumers and ISPs appears to be declining as data allowances are growing.¹⁶⁶ As such, mobile providers are unlikely to be able to use zero-rating offers to undermine competition, particularly since other providers can compete by offering tariffs with larger or unlimited data allowances.

Conclusions on zero-rating

5.57 On balance, our analysis leads us to conclude that zero-rating offers can be largely beneficial to citizens and consumers.¹⁶⁷ In addition, we do not consider that zero-rating offers are likely to undermine competition between ISPs, given current market conditions in the UK. We therefore do not agree with the view of the Internet Society and [ISC] that zero-rating offers generally result in negative outcomes for citizens and consumers. However, we do recognise that in limited circumstances such offers may have the potential to reduce consumer choice by undermining competition between content providers.

Review of our approach to zero-rating offers

Our enforcement and monitoring to date

5.58 Since 2016, we have pro-actively monitored the zero-rating offers which have been introduced to the UK market and have reviewed them on an ad-hoc basis. We have carried out initial assessments of a number of offers and none of these raised sufficient concerns to warrant opening a formal investigation into the zero-rating element of the offers.¹⁶⁸ All our initial assessments have been summarised in our 2019 Framework document and our annual reports monitoring compliance with the net neutrality rules.¹⁶⁹

5.59 To date, we have not had concerns about zero-rating offers that are genuinely open to all content providers of the same class¹⁷⁰ or category of content.¹⁷¹ Our assessment of these types of offers found that they did not exclude content providers that compete with each other, and so were unlikely to influence consumers' decisions about which content providers to use and materially reduce consumer choice in the long term.

5.60 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 content providers were vertically integrated (i.e. ISPs zero-rating their own

¹⁶⁵ As mentioned previously, zero-rating tends to be a feature of the mobile markets, where unlimited data packages are not as universal as for fixed broadband.

¹⁶⁶ Last year we set out our views on the UK mobile market. Ofcom, 2022. [Ofcom's future approach to mobile markets and spectrum: Conclusions paper](#).

¹⁶⁷ In line with this, a significant number of stakeholders agreed with this assessment.

¹⁶⁸ As explained in our Regulatory Enforcement Guidelines, during an initial assessment we explore if the case is an administrative priority for Ofcom, and/or whether the evidence we have justifies opening an investigation, having considered all relevant factors. Ofcom 2022, [Regulatory Enforcement Guidelines for investigations: Guidelines](#), para. 3.5.

¹⁶⁹ Available on [the Ofcom website](#).

¹⁷⁰ See paragraph 5.91 for a definition of class.

¹⁷¹ Ofcom, 2020, [Annual monitoring report](#), para. 3.9- 3.13; Ofcom, 2018, [Annual monitoring report](#), para. 3.16-3.23; Ofcom, 2017 [Annual monitoring report](#), para. 3.13.

content) or when there was zero-rated access to data-heavy content (particularly video streaming).¹⁷²

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

- 5.61 As set out previously, the Internet Society expressed support for the positions taken by the CJEU and BEREC with regard to zero-rating, including that they violate net neutrality and EU law.
- 5.62 In Section 2, and above, we explain that 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; however, UK courts may still choose to take account of these rulings where they consider them to be relevant.
- 5.63 While we have taken into account the CJEU rulings and BEREC's revised position on zero-rating,¹⁷³ our interpretation of the net neutrality rules is that they do not prohibit ISPs from providing zero-rating offers to customers – including where these offers zero-rate specific applications or categories of traffic ('class-based' offers, such as the zero-rating of all video streaming content). Instead, we consider that they require us to review offers on a case-by-case basis and intervene where end-user choice is materially reduced.
- 5.64 Our analysis shows 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 content providers 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.

Our 2019 Framework on zero-rating offers

- 5.65 As explained above, in 2019 we published a framework for assessing zero-rating offers, including the factors we will generally consider as part of our assessment. Based on our preliminary analysis, in our 2022 Consultation we proposed to update and simplify certain aspects of the guidance, given stakeholders had expressed a desire for greater clarity. In particular, we proposed that the guidance would be more useful if:
- the different steps in the assessment process helped ISPs to better identify what offers are unlikely to be of concern and therefore would not require further consideration; and
 - the factors that we consider most relevant to assessing if an offer is likely to be of concern were set out more explicitly.
- 5.66 We are of the view that updated guidance will provide more regulatory certainty for ISPs and content providers about which offers are more or less likely to comply with the net neutrality rules. This in turn should mean that ISPs are more likely to provide zero-rating

¹⁷² 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 Group 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 associated with video streaming, although we ultimately considered that the offers did not appear to materially affect consumer choice.

¹⁷³ As set out at paragraph 5.16, in September 2021 CJEU issued three rulings that found certain zero-rating offers to be in breach of the requirement of equal treatment of traffic in Article 3(3) of the rules, and BEREC subsequently revised its Guidelines in June 2022 to reflect these rulings and explain that zero-rating of specific content providers or categories of traffic is not permitted in the EU.

offers in a way that delivers benefits for citizens and consumers, while mitigating some of the potential competition risks associated with such offers.

Conclusions on our review of our approach to date

5.67 Overall, we consider that zero-rating offers, including those where ISPs zero-rate specific applications or classes of services, can be compatible with the net neutrality rules, although in limited circumstances they may give rise to concerns. However, we are of the view that our 2019 Framework for assessing zero-rating offers could be clearer on the type of offers we are more or less likely to be concerned about and the criteria we will use to assess such offers.

Our updated approach to assessing zero-rating offers

5.68 We have decided to broadly maintain our proposed approach as set out in the 2022 Consultation with minor amendments to address specific comments and provide more clarity.

5.69 We have replaced our 2019 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. We have also decided to clarify that while zero-rating content once a customer's data allowance has been exceeded is prohibited by the rules, we are unlikely to have concerns where access is limited to:

- access to the ISP's own website or application in order for a user to top-up their data allowance;
- access to Type One content; and/or
- access to emergency communications.¹⁷⁴

5.70 Our updated guidance defines three types of zero-rating offers based on the likelihood that each will give rise to concerns. This approach seeks to make clear to ISPs: (i) the 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.¹⁷⁵ Given that ISPs will need to assess the compliance of their offer in any event, we consider that classifying zero-rating offers in this way will provide ISPs with greater certainty about when we are more or less likely to have concerns. We consider this approach will make it easier for ISPs to assess compliance, and therefore we do not agree with the arguments made by two stakeholders ([X] and [Y]) that classification of offers would be contentious, burdensome and add needless complexity.

5.71 With regard to comments from Three and Strand Consult UK that the practice of zero-rating should not be regulated, we consider that there are important protections provided by our approach in the limited circumstances where zero-rating might raise concerns. While we accept that zero-rating is not mentioned in the rules, it is a commercial practice and is therefore captured under Article 3(2) of the Regulation. As explained in paragraph 5.10,

¹⁷⁴ In addition, as discussed in Section 8, we are unlikely to be concerned where ISPs continue to allow zero-rated access to important information for vulnerable customers (e.g. debt advice), where they have otherwise had their service restricted.

¹⁷⁵ Our approach to assessing zero-rating offers will also apply to other retail differentiated pricing practices that are similar to zero-rating. Differentiated pricing is a commercial practice where the price of data is not uniform for all content and services, with zero-rating being a particular instance of this. It includes, for example, sponsored data schemes and data allowances for specific services.

Article 3(1) and Article 3(3) are also relevant. Any changes to the rules themselves would be a matter for Government and Parliament to consider.

Type One – Beneficial content from public bodies, charities and NGOs with no competitors

- 5.72 In recent years, it has become common practice amongst ISPs to zero-rate access to content from public bodies, charities and NGOs that is socially beneficial for all their customers. During the Covid-19 pandemic many mobile providers universally zero-rated such content including, for example, websites supporting victims of crime¹⁷⁶ and the NHS website.¹⁷⁷ As discussed previously, data from recent information requests we have gathered indicate that this has largely continued. Between January and December 2022, all major mobile ISPs universally zero-rated content from some public bodies, charities and NGOs, although the number of zero-rated websites varied between providers.
- 5.73 As set out above, three stakeholders suggested that the criteria for Type One offers should be expanded to include charities and NGOs. We have decided to include these organisations, given the wider social benefits that zero-rating this type of content provides citizens and consumers.
- 5.74 Where public bodies, charities and NGOs compete with similar suppliers, zero-rating could theoretically distort competition between content providers, thereby reducing consumer choice. Therefore, in order for an offer to fall into the Type One category the organisation needs to have no competing suppliers that offer a comparable alternative to the content being zero-rated. Offers of this nature typically have no prospect of harming consumer choice, and therefore we are unlikely to be concerned about them. Once we establish that an offer only provides zero-rated access to beneficial content from any of these bodies with no impact on competition, we will not normally carry out any further assessment.
- 5.75 If an ISP zero-rates access to a public body, charity and/or NGO that competes with a similar supplier, we will review the offer against our Type Two or Type Three criteria. As explained in more detail below, we are unlikely to be concerned about such offers if they are genuinely open to all content providers of a similar class. If, however, such an offer cannot be considered as genuinely open, we will take into account the extent to which it provides wider social benefits to citizens and consumers as part of our Type Three assessment. In some cases, the social benefits provided by a zero-rating offer may outweigh any possible concerns around competition.
- 5.76 In response to Disruptive Analysis' comment that we should consider the consequences of public sector bodies' websites using cloud-based services, our view is that the relevant public sector bodies, ISPs and cloud service providers are free to work together to ensure that the usage of these websites is fully zero-rated. For example, if a zero-rated government service uses a third-party authentication process that is cloud-based, the traffic for the authentication process may be identified as from the third-party cloud service provider, rather than from the zero-rated government service. To ensure that the authentication process is zero-rated, the ISP may need additional information from the government service

¹⁷⁶ UK Government, 2020. [Mobile networks remove data charges for online NHS coronavirus advice](#) [accessed 19 October 2023].

¹⁷⁷ UK Government website, 2020. [Data charges removed for websites supporting victims of crime](#) [accessed 19 October 2023].

and the third-party cloud service provider. In some cases, the ISP may be able to work together with the government service and cloud provider to configure the network in a way that would allow full zero-rating. If the ISP and service providers are unable, or choose not, to zero rate content related to the cloud services, ISPs should communicate this clearly to consumers. This position applies equally to when other third-party content (other than cloud-based services) is hosted on zero-rated websites and applications.

Criteria for classification as a Type One offer

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

- **Socially beneficial:** the information or services that are being zero-rated clearly provide social benefit to citizens and consumers as well as benefitting society at large. This could include, for example, information relating to public health, financial support or support for vulnerable individuals.
- **Provided by a public sector organisation, charity or NGO:** the information or services that are being zero-rated are provided by a public sector body, charity or NGO which is not operating in a commercial, profit-making capacity. This would include the Government, local authorities, government agencies, the UK Parliament and devolved parliaments,¹⁷⁸ as well as charities, non-government organisations and not-for-profits.
- **Absence of competition:** there is no competing supplier that provides a comparable alternative to the information or services being zero-rated.

5.78 In addition, Type One zero-rating offers must be transparent to consumers, as explained in paragraphs 5.127 to 5.128.

Type Two – Open zero-rating offers

5.79 Zero-rating offers are unlikely to raise concerns if all content providers of the same class can be included in the offer. As outlined above, a zero-rating offer could in principle harm consumer choice by undermining effective competition between content providers. However, open offers are unlikely to harm consumers as content providers would not be excluded from relevant offers, and therefore their ability to compete with similar suppliers is not undermined.

5.80 We have therefore decided that once we establish that an offer is genuinely open, we will not normally carry out any further assessment.

What are genuinely open offers?

5.81 As noted earlier, BT Group sought clarification on what a genuinely open offer without undue requirements is. We discuss in more detail below the characteristics of a genuinely open offer, including when requirements to join an offer are likely to be compatible and incompatible with an open offer.

5.82 For a zero-rating offer to be genuinely open (and therefore qualify as a Type Two offer), we would expect that relevant content providers are not deterred from joining by the presence of undue requirements (e.g. disproportionate financial, legal, technical or other requirements), which could discourage or effectively prevent content providers from participating in an offer. In particular, stringent technical, legal or financial requirements

¹⁷⁸ 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 19 October 2023].

could disadvantage smaller content providers. By contrast, a zero-rating offer is less likely to reduce consumer choice if any requirements for content providers to join the offer are reasonable and achievable. Where undue requirements (technical, legal, financial or other) are imposed by ISPs, we are likely to consider these offers as Type Three, rather than Type Two.

Technically necessary requirements are consistent with genuinely open offers

- 5.83 It is not the case that for a zero-rating offer to be considered as genuinely open no requirements can be specified by ISPs.¹⁷⁹ We recognise that certain basic requirements may be technically necessary to set up and run an offer, and we would be unlikely to consider such requirements as deterring a content provider from joining. For example, due to the nature of zero-rating, the ability to identify the traffic of specific content providers is essential. We would therefore be unlikely to consider the requirement for content providers to provide information to ISPs to identify their traffic as undue.
- 5.84 The Internet Society and ORG commented that technical requirements for Type Two offers may make it challenging for certain smaller content providers to join. For an offer to be genuinely open, we would expect content providers who fulfil any basic, proportionate requirements to be included in the relevant zero-rating offers upon request. We consider that zero-rating offers set up in this way should not present disproportionate barriers for content providers to join, whether the content providers are big or small.¹⁸⁰
- 5.85 Where some of the traffic associated with a content provider cannot reasonably be identified because it is encrypted, this would be unlikely to impact the openness of a zero-rating offer. If, for example, a customer is using a VPN or similar arrangements (e.g. Apple Private Relay), identification of the source of the traffic may not be possible without dedicated systems or software. In this case, we would likely still consider the offer as genuinely open if this traffic, cannot be identified by proportionate means. In response to the BBC and Disruptive Analysis' observation that increases in encryption would make zero-rating more challenging, we consider that as long as ISPs clearly communicate to customers and content providers the impact of encryption tools such as VPNs, an offer may still be considered as Type Two.

Payments should not be required by genuinely open offers

- 5.86 As mentioned previously, Amazon and two other stakeholders ([X] and [X]) argued that there should be no payments for Type Two offers. If content providers were required to pay a fee to be zero-rated, smaller content providers with limited resources may be deterred from participating, even if the fee was fairly modest. We understand that payments are generally not a feature of zero-rating arrangements between ISPs and content providers, and that costs to ISPs for setting up and maintaining zero-rating offers are minor.¹⁸¹ As such, we do not consider payments to be essential for running zero-rating offers. Therefore, we

¹⁷⁹ This was suggested by [X] who argued that there should not be any commercial or technical onboarding required for content providers to join class-based offers.

¹⁸⁰ In response to the ORG's comment, we will take a similar approach where content is provided on a federated service, such as Mastodon, so that where the content provider can provide information to allow content to be consistently identified, we would expect that traffic identification should not be a barrier to the content provider being included in a Type Two offer.

¹⁸¹ Ofcom analysis based on: information in BT Group response to the RFI dated 18 April 2022; Three response to the RFI dated 18 April 2022; Vodafone response to the RFI dated 18 April 2022; Virgin Media O2 response to the RFI dated 18 April 2022; and Sky response to the RFI dated 18 April 2022.

consider that a genuinely open zero-rating offer should not request payments from content providers.

Genuinely open offers should be transparent to content providers

- 5.87 Finally, for an offer to be considered genuinely open, it is also important for the terms and conditions of that offer to be transparent to content providers.
- 5.88 We expect that details of the offers should be outlined on the ISP's website so that content providers are aware of offers that are relevant to them and can easily find information on the process for joining such offers. This would also assist our monitoring and any potential enforcement work, ensuring that we can identify offers that could raise concerns.
- 5.89 We also consider that ISPs should be timely in their response to content providers wishing to join an offer. However, we do not consider that imposing a specific timeline for responses to join an offer, as put forward by the Comms Council UK, would be practical nor in the interest of consumers. ISPs' ability to meet a specific deadline will likely vary, and therefore introducing a deadline may have the effect of discouraging certain ISPs from introducing new zero-rating offers.

Classes of services

- 5.90 As set out above, two stakeholders sought clarification on how classes of services for Type Two offers would be assessed. In addition, three stakeholders pointed out the challenges of classifying multi-functional content provider services.
- 5.91 A class is a grouping of content providers who provide similar content, such as video streaming content, audio streaming content or social media. Classes should be defined in a way that is easily understood by consumers and gives them a meaningful choice of different service providers, rather than based on the technical specifications of the traffic. For example, social media services may be defined as a class of services that provide video streaming, messaging as well as picture and text posts. As such, we consider an application or website providing multiple types of traffic should not create significant difficulties for Type Two offers to be tailored around such content providers.

Criteria required to be classified as a Type Two offer

- 5.92 To summarise, a zero-rating offer will be classified as Type Two if it has all of the following features:
- **Class-based:** the offer is genuinely open to content providers providing a particular class of service/s, as opposed to a single content provider or limited number of content providers.
 - **Absence of undue requirements to join:** content providers of the same class should be able to apply to join the offer without any undue requirements (e.g. technical, legal, financial or other). In particular, ISPs should not request payments from content providers to join offers, as this may deter some content providers.
 - **Non-discriminatory treatment:** all content providers included (or seeking to be included) in the zero-rating offer should be treated in a non-discriminatory manner, including any content providers owned by the ISP.
 - **Transparency for content providers and timely responses by ISPs:** the process for a content provider 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 content provider to join an offer.

5.93 In addition, Type Two zero-rating offers must be transparent to consumers, as explained in paragraphs 5.127 to 5.128.

Type Three – Other zero-rating offers

- 5.94 Zero-rating offers that do not meet either the Type One or Type Two criteria will be classified as Type Three. We have decided to replace the three-step approach in the 2019 Framework 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.¹⁸²
- 5.95 To ensure that end-user rights under the net neutrality rules are protected, the Regulation empowers Ofcom to intervene against agreements and commercial practices which may result in consumer choice being materially reduced. Our updated guidance therefore focuses on identifying any zero-rating offers that are likely to undermine content providers' ability to compete effectively and in turn could materially reduce consumers' choice of content providers and services in the long-term.
- 5.96 In our updated guidance, we outline a list of factors that will help us assess whether the zero-rating offer is likely to materially affect consumer choice: (i) whether relevant content providers are excluded from a zero-rating offer; (ii) whether zero-rating is important for a content provider to compete effectively in a market; and (iii) whether the offer is likely to influence consumer behaviour. We will also consider factors such as market power and dynamics, and social benefits to citizens and consumers, to assess whether the impact of a zero-rating offer is likely positive or negative.¹⁸³ We discuss these factors below.
- 5.97 We are of the view that these factors will enable us to not only assess the characteristics of a zero-rating offer, but also the wider competitive and commercial context, as proposed by some stakeholders. In particular, when considering market power and dynamics, we may, where appropriate, take into account whether the relevant content providers and ISPs are vertically integrated.
- 5.98 When assessing Type Three offers, we will consider all relevant factors in the round. 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. For example, where appropriate we may take into account any other offers the content provider is part of, the benefits of innovative ideas on citizens and consumers or factors which help us take a broad view of the social benefits of an offer, as suggested by the BBC, [S&P] and Meta respectively.
- 5.99 In updating our approach, we agree with Amazon and Meta that zero-rating offers should not be a concern simply because they may influence consumer behaviour or because they are longer term. We also agree with the BBC that even short-term zero-rating offers could impact competition between content providers. The influence on consumer behaviour and the duration of an offer are two of the factors we may consider to decide whether the offer is likely to affect consumer choice. This effect could be positive or negative, depending on

¹⁸² Ofcom, 2022. [Regulatory Enforcement Guidelines for investigations](#), para. 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.

¹⁸³ These are factors relevant to the four elements identified in paragraph 5.53.

the impact of the offer on competition and any wider social benefits. Relatedly, while we agree in part with Meta’s observation that data scarcity is not a clear indicator that a zero-rating offer should be cause for concern, we are also mindful that when most consumers have an abundance of data we are less likely to be concerned that zero-rating offers would harm consumer choice.

- 5.100 With regard to the concerns raised by Virgin Media O2, Three and [X] that regulation has a negative impact on innovation, we note that our updated guidance clarifies that we are only likely to have concerns about zero-rating offers in limited circumstances. We are of the view that this will provide ISPs with significant scope to introduce new, innovative zero-rating offers. Any changes to the regulatory framework on zero-rating would involve legislative change, which would be a matter for Government and Parliament.
- 5.101 In response to Virgin Media O2’s assertion that our Type Three guidance is subjective and vague, we have made a number of adjustments to the formatting and language of our guidance. With these changes, it is our view that our updated framework is sufficiently clear to allow ISPs and other stakeholders to understand the offers that are likely to be a concern to us.

Our updated approach to assessment

- 5.102 We set out below our updated approach to assessing Type Three offers, taking into account stakeholders’ comments as described earlier.
- 5.103 Type Three zero-rating offers must also be transparent to consumers, as explained in paragraphs 5.127 to 5.128.

Whether relevant content providers are effectively excluded from the zero-rating offer

- 5.104 As set out under the Type Two sub-section, the easier it is for content providers to join a zero-rating offer, the less likely it will undermine the ability of content providers to compete effectively. We may consider the extent to which a zero-rating offer excludes relevant content providers and undermines their ability to compete by assessing the **openness of a zero-rating offer**.
- 5.105 Even if an offer does not meet all the Type Two criteria, those criteria will still be relevant when assessing the degree of openness of a Type Three offer and whether it may undermine certain content providers' ability to compete.
- 5.106 The openness of a zero-rating offer may be affected by various technical, legal and financial (and other) requirements. Specifically, we note that while some payments between content providers and ISPs for a zero-rating offer may not be of concern, the higher the payments, the more likely some content providers may be effectively excluded from joining an offer.
- 5.107 In addition, we are more likely to consider an offer to be open if the information about the offer is available to content providers (for example, published by ISPs on their website or available upon request).¹⁸⁴

Whether it is important for a content provider to be zero-rated to compete effectively

- 5.108 If only a small number of consumers actually make use of a zero-rating offer, the overall impact of the offer may not be sufficient to materially affect non-zero-rated content

¹⁸⁴ As set out above, techUK recommended that Type Three offers should be made public. In response, we consider that the degree of information available to content providers would in itself be a factor to consider when assessing such offers.

providers' ability to compete. However, if zero-rated access to a certain class of content was pervasive among consumers, and contingent on the other factors in our Type Three framework, a content provider of the same class may find it difficult to compete effectively if it is not zero-rated. Therefore, we may consider:

- **Scale of take-up:** the higher the overall take-up of a zero-rating offer by customers, the higher its potential impact on competition between content providers. The take-up may be measured by the number or proportion of UK customers who have access to the zero-rated content being assessed.¹⁸⁵
- **Duration of the offer:** when zero-rated access to content is only provided for a short-duration (e.g. a limited trial period) the offer is less likely to have an impact on how content providers compete, especially in the long-term. However, there may be a larger impact if consumers have zero-rated access to a content provider for a sustained or indefinite period of time.

Whether the offer is likely to influence consumer behaviour

5.109 While an offer that influences consumer behaviour would not necessarily automatically raise concerns, a content provider's ability to compete would be more likely affected if consumers' behaviour is materially influenced by the offer. We expect that 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 content. To assess this, we may consider the following factors:

- **Data scarcity:** we may consider the take-up of contracts with unlimited data allowances and for those consumers with limited data, how much unused data they have each month. The latter will be driven both by their monthly data allowances and the amount of data that they typically use. The larger their data allowance and the less data they normally use (and so the less scarce data will be for them), the less likely it is that an offer would influence their choice of content providers.¹⁸⁶
- **Data usage for zero-rated content:** the heavier the data usage associated with zero-rated content, the more likely it is that consumers will prefer to use zero-rated content as opposed to non-zero-rated content, in order to preserve their data allowance. For example, video streaming services are more data-heavy compared to online news, and therefore an offer with zero-rated video streaming is more likely to appeal to consumers who would like to preserve their data. As part of this, it will also be relevant to consider if consumers typically access content using mobile data (as opposed to Wi-Fi internet access where the connectivity is likely to have a higher, or unlimited, data allowance), as the zero-rating of such content is more likely to influence consumers' choice of which content provider to use.¹⁸⁷
- **Other relevant features of an offer:** other factors could compound the effect that a zero-rating offer may have on consumer behaviour. For example, if an ISP

¹⁸⁵ 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.

¹⁸⁶ 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 evidence on monthly data usage by UK consumers (where such information is available).

¹⁸⁷ 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 content.

provides free or discounted access to content (which normally requires a subscription fee) in addition to zero-rating the content, the potential for the offer to influence consumer behaviour will increase.

5.110 For an offer that is likely to have a material impact on consumer choice, we may also assess 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*¹⁸⁸

5.111 The market position of ISPs or content providers (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 content provider or 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 content provider:** content providers with a strong market position, if part of a zero-rating offer, are more likely to have the ability and incentive to use zero-rating offers to stifle competition and undermine smaller content providers, and therefore preserve their strong existing position. In contrast, where the offer relates to a smaller, challenger content provider 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:** an ISP with a strong market position, if it uses a zero-rating offer to give preferential treatment to a narrow selection of content providers, is more likely to have a large impact on competition among the relevant content providers, given the number of subscribers of this ISP. In this way, ISPs hold a gatekeeper position over their customers, providing them with a degree of market power over content providers. In a competitive market we expect that consumers will be able to choose from a range of ISPs that suit their needs, and that competition will likely incentivise ISPs to provide zero-rating offers that best suit consumers' preferences of content providers.
- **Vertical Integration:** a vertically-integrated ISP-content provider with a strong market position can have a greater incentive and ability to create a zero-rating offer that could give itself an advantage by giving preferential treatment to its own services that are in competition with the services provided by other rival content providers. 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 own content with a zero-rating offer. Such behaviour may disadvantage rival content providers and increase barriers for content providers looking to expand in the market.
- **Characteristics of the content provider market** – zero-rating offers could compound or reduce the barriers to entry (or expansion) in certain content provider markets, depending on whether they apply to incumbents or smaller

¹⁸⁸ When assessing the market position held by either a zero-rated content provider 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.

firms or new entrants.¹⁸⁹ For example, in markets with strong network effects,¹⁹⁰ zero-rating offers applied to incumbents can add to these barriers and strengthen the existing market position of the incumbent content provider. Furthermore, such offers may increase the chance of the market tipping towards content providers that are zero-rated, if these content providers have market power in adjacent markets which they could leverage, to make it hard for new content providers to enter and/or expand.

Social benefits to citizens and consumers

5.112 The factors above relate to whether a zero-rating offer could affect content providers' ability to compete effectively, which in turn may materially reduce consumer choice. However, at times it may also be important to consider other factors when assessing Type Three offers. In particular, even if an offer does not meet all of the Type One and Type Two criteria and may raise some potential concerns based on the Type Three criteria above, we will still consider the social benefits that the content provides to citizens and consumers, where relevant. In some circumstances, the social benefits of zero-rating offer may outweigh any potential competition concerns. 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 citizen's health and safety. This could include, for example, charity helplines, mental health support and support for victims of crime.
- **Assisting low-income consumers:** we will recognise the benefit of zero-rating offers that provide relevant content to assist low income consumers (e.g. zero-rated information from Citizens Advice).

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

5.113 As set out in Section 2, 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.¹⁹¹

Our approach to enforcement to date

5.114 There was 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 during

¹⁸⁹ 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](#).

¹⁹⁰ Network effects are relevant when the value that a consumer gets from a content provider 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.

¹⁹¹ Article 3(3) of the Regulation.

the Covid-19 pandemic, where 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.¹⁹²

- 5.115 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. We took the view that access to this service should take priority.¹⁹³

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

- 5.116 In principle, we consider allowing access to zero-rated content after a customer has exhausted their data allowance would have largely the same benefits and raise similar concerns as zero-rating offers generally.
- 5.117 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 social 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.
- 5.118 We recognise that certain types of zero-rated access past the data allowance could be 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 content provider, this could adversely affect competition and consumer choice. This is because in effect many consumers would have a sub-internet service controlled by the single content provider, where their access to the wider internet is barred and the openness of the internet is eliminated.¹⁹⁴
- 5.119 However, under our 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 approach already provides us with a framework to identify sub-internet style offers.

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

- 5.120 We consider that there would be clear benefits in allowing zero-rated access to continue once the customer's data allowance has been exhausted (subject to certain concerns, discussed above). As this is prohibited by the net neutrality rules on traffic management, 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.¹⁹⁵
- 5.121 However, we are unlikely to be concerned where zero-rated content that can still be accessed after the data allowance is exhausted is limited to:

¹⁹² 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](#), para. 3.12- 3.13.

¹⁹³ Ofcom, 2021. [Statement: Emergency video relay](#).

¹⁹⁴ A definition of 'sub-internet service' is available in our updated guidance.

¹⁹⁵ We discuss legislative change further in Section 13.

- the ISP’s own website or application in order for a user to top-up their data allowance;
- Type One content; and/or
- emergency communications.¹⁹⁶

- 5.122 In addition, as discussed in Section 8, we are unlikely to be concerned where ISPs continue to allow zero-rated access to important information for vulnerable customers (e.g. debt advice), where they have otherwise had their service restricted.
- 5.123 Allowing ISPs to zero-rate access to their web portal or app once a customer’s data allowance has been exhausted to enable them to top-up their allowance is unlikely to be problematic. Given that only a customer’s existing ISP can offer this service, the ability of other firms to compete is not undermined. It follows that a pragmatic approach to applying Article 3(3) in this instance is in the best interest of citizens and consumers. A strict interpretation would be impractical as it would greatly restrict customers’ ability to buy more data when they have run out.
- 5.124 Similarly, ISPs continuing to zero-rate Type One content once a data allowance has been used up is highly unlikely to undermine competition. This is because an offer can only be considered as Type One if the content provider being zero-rated does not have commercial incentives nor competing suppliers. Again, a practical application of the traffic management rules in this case will likely deliver positive outcomes to customers, by enabling ISPs to give their subscribers unrestricted access to socially beneficial information and services.
- 5.125 With respect to emergency communications, as explained in more detail below in Section 8, it is our view that zero-rating emergency communications past a data allowance is permitted by the net neutrality rules where this is done to comply with the General Conditions.
- 5.126 As set out earlier, two stakeholders suggested that we expand the list of circumstances where we are unlikely to have concerns about continued zero-rated access past a data allowance. Any further flexibility in this area would be a matter for Government and Parliament, and we do not consider it would be appropriate for us to identify more general circumstances, as put forward by stakeholders. The suggested approaches were very broad and in clear contravention of the net neutrality rules. In our view it is only appropriate for us to identify more specific cases, as outlined above, where there is a clear public benefit to access being allowed past the data allowance or where access past a data allowance is permitted in order to comply with the General Conditions.

Transparency requirements for zero-rating offers

- 5.127 As mentioned above, two stakeholders highlighted the importance of transparency for zero-rating offers. We note that the net neutrality rules set out several transparency requirements for ISPs relating to information within customer contracts. ISPs must also adhere to transparency obligations set out under the General Conditions (GCs), specifically C1 of the GCs, including Table A and Table B in the annex to this condition.
- 5.128 To fulfil the transparency requirements specified in the rules and GCs when providing zero-rating offers, ISPs should clearly explain to customers which content providers are zero-

¹⁹⁶ In reaching this decision, we considered the calls for legislative change from BT Group and the Competitive Enterprise Institute and the opposition to this expressed by the BBC. We also took into account the views put forward by stakeholders on whether more zero-rated content should be able to be accessed once a customer’s data allowance has been used up.

rated as part of their mobile tariff, including what aspect of a content provider's content is and is not zero-rated as part of their package. For example, if not all the content within an application or website is zero-rated, this should be explained to customers in a way that is meaningful to them. This information should be made available on the ISP's website. It should include information for legacy contracts (i.e. contracts which are still active, but not being offered to new customers).

- 5.129 We consider that these requirements will mitigate the concerns raised by Google and techUK that non-zero-rated, third-party content embedded within zero-rated sites may mislead customers. With respect to Amazon's suggestion that it should be compulsory for ISPs to make the terms and conditions of their zero-rating offers public, particularly for the benefit of content providers, our updated framework for assessing commercial zero-rating offers under Type Two specifies that information on the process for joining an offer should be publicly available for content providers. For Type Three offers, the openness of the offer is one of the factors that we will consider when assessing if it is likely to contravene the net neutrality rules. We also set out above the requirements of ISPs in relation to transparency for consumers. Our view is that this will enable sufficient transparency of zero-rating offers between ISPs, content providers and customers.

Our approach to monitoring, reporting and ensuring compliance

- 5.130 Before introducing a zero-rating offer, ISPs should self-assess the proposed offer against the framework set out in our guidance. In doing so, they should form a view on whether the offer is likely to comply with the net neutrality rules, using the criteria and factors we identify in the framework. ISPs do not need to seek authorisation from us for new offers before they are introduced. We consider that an ex-ante approach to assessment may stifle innovation and introduce an unnecessary burden on ISPs. It follows that it would not be appropriate for us to thoroughly assess each proposed zero-rating offer, as recommended by the FCS.
- 5.131 As explained in Section 2, the Regulation places a duty on us to "closely monitor and ensure compliance" with the rules.¹⁹⁷ To meet this obligation, we will gather information from ISPs on their zero-rating offers where necessary.¹⁹⁸ This information is likely to relate to the characteristics of the offer and the assessment undertaken by ISPs to ensure compliance with the Regulation and our guidance. For example, we may gather information regarding the content and applications being zero-rated, the requirements for new content providers to join the offer and the information that is provided to customers and content providers about the offer. This will allow us to check whether the offer is Type One or Type Two, in which case we do not expect to gather further data unless concerns are raised to us by content providers or customers.
- 5.132 Where it appears that an offer is Type Three, we will request data on a case-by-case basis depending on the specific offers. This data may include (and we would expect ISPs to be able to provide information on) the number of customers, customer data usage, data usage

¹⁹⁷ We therefore agree with Google's suggestion that we should regularly monitor ISPs' behaviour regarding zero-rating.

¹⁹⁸ As noted above, the FCS suggested we change our guidance from 'we *may* gather this information (zero-rating data)' to 'we *will* gather this information' (emphasis added). We have made this change, as we will be gathering information for our annual monitoring report.

associated with the zero-rated content and any engagement with content providers providing similar services that are not included in the offer. In addition, we may assess zero-rating offers in response to complaints and concerns raised with us, and broader assessments may also be initiated in response to market developments. We will report on our findings in relation to these activities in our annual monitoring report, to facilitate further transparency for consumers and content providers. More information on our approach to monitoring and reporting is set out in Section 12.

6. Traffic management

Introduction

- 6.1 In this section, we present our analysis and conclusions on traffic management.
- 6.2 In summary, we have concluded that we should provide further clarity on how ISPs can use traffic management. The net neutrality framework requires that ISPs treat all traffic equally when providing internet access services except in the case of certain exceptions. In this section, we focus on two of those exceptions:
- i) the use of reasonable traffic management to contribute to the efficient use of networks; and
 - ii) the use of additional traffic management that goes beyond reasonable traffic management to prevent congestion or imminent congestion.
- 6.3 Under the rules, ISPs are able to use reasonable traffic management measures where the traffic within a particular category is treated the same and different categories of traffic are only treated differently according to their technical quality of service requirements. As such, the ability to use reasonable traffic management measures is contingent on ISPs being able to identify traffic accurately. Therefore, we clarify how we expect reasonable traffic management to be used where the vast majority of traffic is identified accurately, and how we expect unidentified traffic should be treated.
- 6.4 There may be specific circumstances where reasonable traffic management is insufficient to address the undesirable outcomes of congestion. In these circumstances, ISPs have additional flexibility to go beyond reasonable traffic management to prevent congestion. We clarify that we expect ISPs to address congestion in the least intrusive manner and reflective of the severity of the congestion, that any action should be targeted at the affected parts of the network and not be maintained for longer than is necessary.
- 6.5 It is important that ISPs provide consumers with sufficient transparency about how traffic management is applied on a network, under which circumstances, and how this might be expected to impact the service they receive. It is also important that we have sufficient information and data that allows us to monitor the application of traffic management practices. We set out how ISPs should meet their obligations to provide sufficient information to consumers and clarify our approach to monitoring.
- 6.6 Our new guidance setting out our updated approach is in Annex 1.
- 6.7 This section is structured as follows:
- we first outline the regulatory framework on traffic management;
 - we then outline our proposals relating to traffic management that were set out in our 2022 Consultation and summarise stakeholder responses to those proposals; and
 - finally, we provide our analysis (including our response to stakeholder comments) and decisions.

Background

The regulatory framework on traffic management

- 6.8 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”*.
- 6.9 This Article therefore focuses on safeguarding the open internet and requires ISPs to treat all traffic equally when providing internet access services.¹⁹⁹ 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 content providers that want to deliver content and services to these customers. As set out in Section 4, we consider that concerns about the gatekeeper position of ISPs that the net neutrality framework seeks to address will remain relevant going forward, and our policy assessment and approach reflects this.
- 6.10 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 that contribute to an efficient use of network resources and to an optimisation of overall transmission quality. To be considered ‘reasonable’ traffic management, measures need to meet four cumulative criteria:²⁰⁰
 - i) they must be transparent, non-discriminatory and proportionate;
 - ii) they must not be based on commercial considerations, but on objectively different technical quality of service requirements relating to the specific categories of traffic;
 - iii) they must not monitor the specific content; and
 - iv) they must not be maintained for longer than necessary.
 - Article 3(3) also allows ISPs to go beyond ‘reasonable’ traffic management measures and use more intrusive techniques in very limited exceptional circumstances.²⁰¹ Such measures must be necessary, and applied only for as long as necessary, in order to:
 - i) comply with UK law;
 - ii) preserve the integrity and security of the network, services, or terminal equipment of the end users; or
 - iii) prevent impending network congestion and mitigate the effects of exceptional or temporary network congestion (but not recurrent and more long-lasting network

¹⁹⁹ Article 3(3), first subparagraph of the Regulation.

²⁰⁰ Article 3(3), second subparagraph of the Regulation.

²⁰¹ Article 3(3), third subparagraph 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.

congestion which is neither exceptional nor temporary), provided that equivalent categories of traffic are treated equally.

- 6.11 Article 3(4) sets out that *“Any traffic management measure may entail processing of personal data only if such processing is necessary and proportionate to achieve the objectives set out in paragraph 3.”*
- 6.12 The effect of the above provisions is also to restrict the ability of ISPs to charge content providers for carrying or prioritising traffic as part of the internet access service or to take account of commercial considerations in their traffic management. We discuss the impact of these provisions on the ability of ISPs to charge content providers further in Section 11.
- 6.13 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.²⁰² As set out in Section 4, these transparency measures aim to facilitate effective choice by consumers, and thus support the objective of safeguarding the open internet. For example, they ensure consumers have the right information to effectively choose an ISP that allows them to access the content providers 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.²⁰³

Our 2022 Consultation

- 6.14 While the current framework already allows for traffic management measures, we are concerned that a perceived lack of clarity could constrain ISPs’ ability to apply traffic management, and this would be inconsistent with our objectives of safeguarding the open internet and promoting well-run, efficient and robust networks.
- 6.15 We therefore proposed clarifications on permissible traffic management actions, which we considered would provide ISPs with more flexibility to appropriately manage traffic. We considered that further flexibility in traffic management would be beneficial if it expanded the options available to ISPs to deal with congestion, helped to reduce the impact of congestion on user quality of experience, and lowered network costs in the long run, therefore improving outcomes related to our objectives.
- 6.16 Our 2022 Consultation proposals focused on providing guidance on ISPs’ ability to apply traffic management to prevent impending congestion and to mitigate the effects of exceptional or temporary network congestion i.e. where ISPs use additional traffic management that goes beyond ‘reasonable’ traffic management, in certain circumstances. We proposed guidance setting out that:
- Traffic management should be limited in duration and frequency.

²⁰² Article 4(1) and Article 4(1) (a) of the Regulation.

²⁰³ Article 5(1) of the Regulation. Additionally, Section 7 of the [Open Internet Access \(EU Regulation\) Regulations 2016](#) as amended by the [Open Internet Access \(Amendment etc.\) \(EU Exit\) Regulations 2018](#) gives Ofcom powers to *“impose requirements”* to *“ensure the continued availability of non-discriminatory internet access services at levels of quality that reflect advances in technology”*.

- If possible, such traffic management should be targeted at the affected parts of the ISP's network i.e. the parts of the network that are congested or where congestion is imminent.
- ISPs should not treat specific content, applications or services differently to other content of a similar category within the affected part of the network (and that similar categories of traffic should be understood as those with similar technical characteristics). Where traffic cannot be identified consistently, then all traffic should be treated the same.
- ISPs must ensure that they are transparent about the traffic management practices they apply, to enable their customers to make informed and effective choices; they must also ensure that their practices comply with the requirements in relation to meeting contracted levels of quality, laid down in Article 4 of the Regulation.

6.17 To enable us to perform the necessary monitoring and supervision of the net neutrality framework, we proposed that ISPs should be able to provide Ofcom with information, on request, to assess whether use of traffic management is compliant with the Regulation. We also anticipated that Ofcom would gather information periodically to monitor compliance with the rules, and that information gathered may also be used in Ofcom's annual reporting on net neutrality.

6.18 Currently, traffic management measures that treat equivalent categories of traffic differently are not allowed under existing legislation. While any changes to legislation would be a matter for Government and Parliament, we considered that further flexibility to allow ISPs to apply more targeted traffic management could be beneficial and consistent with our objective to ensure well-run, efficient and robust networks. While we acknowledged that there was a risk that ISPs could use such flexibility to undermine the open internet and internet-based innovation, we considered this risk could be materially mitigated with appropriate proportionality, transparency and non-discrimination requirements, as well as appropriate monitoring and enforcement.

Stakeholder responses

Flexibility to manage traffic effectively under our proposed guidance

6.19 We received opposing stakeholder views about the level of flexibility (and impact) that our proposed guidance on traffic management gave to ISPs.

6.20 Several ISPs raised concerns over the lack of flexibility they had to manage traffic on their networks:

- Virgin Media O2 argued that the near blanket prohibition on any meaningful traffic management means that networks are configured to be able to manage high demand events that occur very rarely, without any mitigating measures. It argued that this forces ISPs to invest in capacity when they could be investing in innovative new services and technologies.²⁰⁴ While it indicated that the proposed guidance was useful in giving clarity on addressing congestion, it considered that

²⁰⁴ [Virgin Media O2 response](#) to the 2022 Consultation, p. 11.

the guidance did not allow ISPs to take action that is meaningfully different to that which is permitted presently.

- Virgin Media O2 also believed that Ofcom viewed congestion as circumstances where a network ceases to function, rather than a regularly occurring trait (for example in the evening) which leads to traffic management being regarded as a measure akin to ‘emergency action’ as opposed to something that should be a routine component of efficient network management. It considered that a shift in mindset towards what it called “a more proportionate, technically and economic regulatory approach” to traffic management would deliver benefits in terms of efficiencies to ISPs and better end user experiences for consumers.²⁰⁵
- Vodafone made a similar point and suggested Ofcom should clearly distinguish between one off event type ‘congestion’ caused in a particular location or due to a particular event (such as a major viewing event) from the daily or weekly peaks that occur in networks where there may be slowing down in speeds due to demand converging at a particular time.²⁰⁶
- Three referred to the growth in data traffic posing key challenges for mobile network operators (MNOs) that face greater capacity constraints than fixed ISPs. It noted that an MNO can address these traffic peaks through either expanding capacity or through traffic management. However, it argued that MNOs are not permitted to effectively manage traffic in times of congestion since it cannot invoke exceptional traffic management if the network is frequently congested due to ‘under-investment or capacity scarcity’ and therefore recurrent congestion must be addressed through expanding capacity.²⁰⁷ Vodafone also highlighted that in mobile networks, the finite nature of radio spectrum must be managed carefully and that Ofcom should aim to take a sympathetic approach to enforcement of traffic management given the range of applications and consumer requirements that need to be balanced.²⁰⁸
- Vodafone also argued that mobile networks in particular need to be able to effectively manage very heavy users that use the network on a high intensity basis (at levels well in excess of what could reasonably be considered normal personal use) and cause network congestion. It considered that ISPs need the freedom to apply fair usage policies to help manage this threat.²⁰⁹

6.21 A number of stakeholders raised concerns about our proposed guidance giving ISPs too much flexibility to manage traffic delivered on their networks:

- Akamai raised concerns relating to allowing ISPs to prioritise different categories of traffic. Firstly, it submitted that where ISPs need to respond to high traffic events, they will be incentivised to respond by restricting certain categories of traffic as opposed to today, where ISPs plan for those events through cross-industry collaboration and capacity upgrades. Second, it would put ISPs in the position to make unilateral judgements about the value of different traffic classes, when these decisions should be left to users. Third, it considered there was a risk that prioritising categories of traffic could stifle innovation, since it would make it

²⁰⁵ [Virgin Media O2 response](#) to the 2022 Consultation, p. 21.

²⁰⁶ [Vodafone response](#) to the 2022 Consultation, p. 8.

²⁰⁷ [Three response](#) to the 2022 Consultation, pp. 19-24.

²⁰⁸ [Vodafone response](#) to the 2022 Consultation, p. 9.

²⁰⁹ [Vodafone response](#) to the 2022 Consultation, p. 8.

harder for future technologies to flourish given it will take time for ISPs to properly classify them and prioritise them with respect to other traffic categories.²¹⁰

- Amazon raised similar concerns relating to the incentives for ISPs to invest in their networks and putting ISPs in the position of making decisions about which traffic is valuable to consumers.²¹¹
- In relation to using traffic management to address congestion, [3<] was concerned that interpretations may differ on the definition of “exceptional”, since some ISPs may consider an exceptional peak being something that only happened once every 6 months, others once every month and others anything that diverges from their daily average traffic. Similarly, interpretations may differ on what is meant by “imminent risk of congestion”.²¹²

6.22 Meta agreed with the proposed guidance and considered that non-discriminatory traffic management should be permitted to address congestion and that our proposals helped ensure that traffic management did not conflict with the strict wording or interpretation of the Regulation.²¹³

Identifying and categorising traffic

6.23 Several ISPs raised concerns over the feasibility of being able to identify all traffic in order to treat equivalent categories of traffic equally and the implications this has on their ability to manage traffic on their networks:

- Three indicated that ISPs cannot meet the requirement of treating equivalent categories of traffic equally since a significant share of traffic (e.g. encrypted or Virtual Private Network (VPN) traffic) cannot be recognised or categorised. Consequently, under Ofcom’s proposed guidance, since ISPs cannot consistently categorise traffic, it considered they can only comply with the rules by treating all traffic equally.²¹⁴
- BT Group and Vodafone also highlighted the technical challenges of identifying all content within a traffic category.²¹⁵ BT Group suggested that ISPs’ ability to identify traffic could be improved through initiatives such as traffic tagging (e.g. through standardising information in the traffic “header”). It considered that in many cases, information to tag traffic may already be available, but industry players are not incentivised to provide it.²¹⁶
- Akamai argued that permitting ISPs to prioritise different categories of traffic may incentivise ISPs to develop techniques such as Deep Packet Inspection (DPI), that could compromise the privacy of the user and allow the ISP to gain new and unwelcome insights into their users’ patterns of behaviour. It also considered that there would be risks if ISPs were allowed to implement voluntary traffic classification programs with content providers, since these would favour larger established content providers that were more able to take advantage of such

²¹⁰ [Akamai response](#) to the 2022 Consultation, p. 6.

²¹¹ [Amazon response](#) to the 2022 Consultation, p. 12.

²¹² [3<] response to the 2022 Consultation, p. 2.

²¹³ [Meta response](#) to the 2022 Consultation, p. 10.

²¹⁴ [Three response](#) to the 2022 Consultation, p. 23.

²¹⁵ [Vodafone response](#) to the 2022 Consultation, p. 9.

²¹⁶ [BT Group response](#) to the 2022 Consultation, pp. 13 and 15.

arrangements (with new, independent content providers being left to navigate potentially complex classification programs from multiple ISPs).²¹⁷

- Amazon argued that, because of ubiquitous encryption, ISPs might be unable to reliably distinguish between different categories of traffic (as part of determining which traffic is more or less time or quality sensitive). As a result, ISPs may make assumptions that could result in errors about which traffic is being prioritised or deprioritised.²¹⁸

Cross-industry forum and Code of Practice

6.24 BT Group and TalkTalk suggested that Ofcom could take a lead in bringing together industry (e.g. ISPs and content providers), as part of a cross-industry forum, that seeks to agree principles around content delivery that supports network efficiency, which could be the basis for a Code of Practice. For example, this could include: agreeing principles around how content providers should plan and communicate expected traffic volumes including warning of peaks to ISPs; agreement that downloads should be delivered outside of peaks; technical agreements on types of compression that should be used; and how content providers should connect into ISPs (e.g. when caches/Content Delivery Networks (CDNs)/multicasting should be used).^{219 220}

Proposed approach to transparency

6.25 Content providers and CDNs stressed the importance of transparency. Akamai argued that, to the extent that traffic management is permitted, this should be accompanied by robust transparency requirements including notifications about when a network is congested and the categories of content that are deprioritised to manage that congestion.²²¹

Proposed approach to reporting and monitoring

6.26 Some ISPs argued that our proposed approach to reporting and monitoring was overly onerous:

- While Vodafone acknowledged that transparency measures are important to ensure consumers make informed decisions, it argued that ISPs should be able to manage traffic in a non-discriminatory way without providing any information to Ofcom on that activity. It argued that the proposed reporting requirements were disproportionate, creating a burden for ISPs and Ofcom. Ofcom should confine any reporting matters to where there is a likelihood or suspicion of harm.²²² KCOM referred to the non-trivial compliance costs that would be imposed on ISPs because of the expansion of monitoring and reporting activities under our proposed guidance.²²³

²¹⁷ [Akamai response](#) to the 2022 Consultation, p. 7.

²¹⁸ [Amazon](#) response to the 2022 Consultation, p. 11.

²¹⁹ [BT Group](#) response to the 2022 Consultation, p. 14.

²²⁰ [TalkTalk response](#) to the 2022 Consultation, p. 5.

²²¹ [Akamai](#) response to the 2022 Consultation, p. 8.

²²² [Vodafone](#) response to the 2022 Consultation, p. 9.

²²³ [KCOM response](#) to the 2022 Consultation, p. 2.

- Virgin Media O2 argued that the proposed additional monitoring and reporting may serve as a disincentive for ISPs to make use of the traffic management clarifications that Ofcom has set out.²²⁴

6.27 On the other hand, several content providers stressed the importance of monitoring:

- Amazon and Meta highlighted the importance of there being sufficient transparency and monitoring to ensure that traffic management is not used to intentionally discriminate or self-preference.^{225 226}
- Google encouraged the regular publication of reports on network management to help consumers better understand their ISPs traffic management practices and identify emerging issues that the industry needs to tackle.²²⁷

Our analysis and conclusions

The purpose of traffic management

6.28 The starting point for traffic management in the net neutrality framework is that ISPs treat all traffic equally when providing internet access services. This supports the regulatory objectives of ensuring the open internet and internet-based innovation by limiting the ability of ISPs to exploit the gatekeeper position they hold between their customers and the content providers that want to deliver content and services to these customers.

6.29 However, this traffic management approach could have an impact on the efficient build, management, and use of networks across the internet value chain as:

- it influences how ISPs build capacity and directly constrains how they manage their networks (which has implications for the quality of experience that customers receive and the prices they pay); and
- it can lead to an indirect impact, by affecting the incentives of ISPs, content providers and other players across the wider value chain to build, manage, and use networks efficiently. We discuss those incentives in further detail in Section 4.

6.30 As a consequence, if ISPs are limited in their use of traffic management, this can impede their ability to efficiently use and optimise their networks, particularly since they are unable to apportion network resources based on the quality requirements of traffic. This can mean:

- Where a network is reaching its capacity and/or facing congestion, there is a detrimental impact on the quality of experience for customers overall, since the network cannot prioritise more quality sensitive traffic accordingly. Where congestion does arise on certain links, it may undermine the functioning of large segments of the network, or in the most extreme cases, an entire network.
- There is also a risk that network capacity provided for network resilience is used to deal with exceptional traffic peaks. While this can be an effective way to address exceptional congestion, this could put at risk technical failures, network security threats or events, which are not related to peaks in demand.

²²⁴ [Virgin Media O2](#) response to the 2022 Consultation, p. 21.

²²⁵ [Amazon](#) response to the 2022 Consultation, p. 11.

²²⁶ [Meta](#) response to the 2022 Consultation, p. 10.

²²⁷ [Google response](#) to the 2022 Consultation, p. 11.

- Over the long-term more investment is needed to add capacity to the network to meet the growth in peak traffic volumes and/or carry traffic at exceptional peaks to address congestion. The types of fixed and mobile networks costs that vary with traffic are described in paragraphs 11.26 and 11.29. While the growth in traffic volumes overall may mitigate this impact, there is a risk that ISPs systematically increase the capacity in their networks which may only be utilised at peak times.
- 6.31 As set out in Section 2, alongside the objective of ensuring the open internet and internet-based innovation, we also have an objective of supporting well-run, efficient and robust networks. This is important for us in fulfilling 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.
- 6.32 The net neutrality framework allows for these objectives to be balanced by permitting reasonable traffic management where this optimises the network and, in specified circumstances, additional measures that go beyond reasonable traffic management to address congestion (or imminent congestion).

The framework has safeguarded the Open Internet

- 6.33 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.
- 6.34 Since the net neutrality framework was introduced in 2016, it has supported consumer and citizen choice of content as well as ensuring content providers are able to deliver their content to them. In carrying out our duty to monitor compliance, we have not seen any evidence of ISPs' practices which have resulted in the blocking or throttling of individual content providers, or of ISPs determining which content providers should succeed in any given market segment.
- 6.35 Overall, the net neutrality framework appears to be delivering strong protections for consumers, citizens and content providers in order to safeguard the open internet and facilitate innovation.

ISP investment has generally met the increasing demands on networks but there are some risks

- 6.36 ISPs build networks to provide capacity to carry traffic peaks based on the traffic throughput experienced in the busy hour, usually allowing for some additional capacity for exceptional peaks. This ensures that at the busiest times on the network, any adverse impacts on network performance (such as congestion, higher latency, jitter or packet loss), from a lack of network capacity are not material.
- 6.37 Where ISPs compete effectively, they should have appropriate incentives to make investments to meet expected traffic demands, to ensure they deliver a good quality of experience to their customers.
- 6.38 In our 2022 Consultation, we considered that investment had allowed ISPs to meet the growth in traffic volumes and increases in peak usage, and in general meant that the highest peaks in demand appeared to have had a limited adverse impact on ISPs' network performance. However, we acknowledged that our analysis was based on evidence relating

to overall traffic peaks and network capacity. Furthermore, we recognised that there may be localised peaks that affect particular parts of a network and that these might be particularly relevant for mobile networks.

- 6.39 Since our 2022 Consultation, we have gathered further evidence from ISPs relating to traffic peaks and network performance, including:
- the impact of a large traffic peak on 15 February 2023;²²⁸
 - traffic growth and traffic peak levels; and²²⁹
 - the incidence of congestion at cell sites on mobile networks.²³⁰
- 6.40 Internet traffic reached a new peak on 15 February 2023, coinciding with the streaming of a Premier League game on Amazon Prime and a Call of Duty gaming update. Given the potential for exceptional traffic peaks to adversely impact network performance, we examined evidence from ISPs on the impact of this peak on their networks.
- 6.41 The evidence indicated that the traffic peak on 15 February 2023 had minimal or no impact on network performance and that overall network capacity was sufficient to deliver the peak traffic.²³¹ As set out in Annex 3, ISPs are making significant investments to increase the capacity of their networks. However, it remains the case that traffic peaks can impact the network at a local level and note that [redacted] indicated that specific network links were reaching capacity²³²; and [redacted] indicated that capacity reserved for resilience was used to deliver the traffic.^{233 234}
- 6.42 We asked ISPs to provide data on their top 10 traffic peaks for 2022. This allowed us to compare the absolute size of these peaks against the 2019-2021 data that we had previously gathered. The data for 2022 suggests that the absolute size of traffic peaks is continuing to increase year on year. Traffic peaks are growing at a rate of about 23% per year since 2019 for fixed ISPs and about 34% for mobile ISPs. This is broadly consistent with the increase in busy hour traffic.
- 6.43 As the overall demands on networks increase, there is potentially a higher risk to network performance. 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.
- 6.44 While average traffic peaks have increased, they appear to be in line with the growth in busy hour traffic. This suggests that network demand is not becoming 'peakier'. However, there is uncertainty around the level of exceptional traffic peaks going forward. Where these are not fully anticipated by ISPs in their plans to upgrade, or where they are more localised, these could impact network performance (for example, through congestion).

²²⁸ RFI dated 13 February 2023 to BT Group, Sky, TalkTalk, Three, Virgin Media O2 and Vodafone.

²²⁹ RFI dated 13 February 2023 to BT Group, Sky, TalkTalk, Three, Virgin Media O2 and Vodafone.

²³⁰ RFI dated 18 April 2023 to BT Group/EE, Three, Vodafone and Virgin Media O2.

²³¹ Several ISPs did not measure the impact of the peak on network performance.

²³² [redacted] response dated 18 May 2023 to the RFI dated 18 April 2023, Question 4.

²³³ [redacted] response dated 24 May 2023 to the RFI dated 18 April 2023, Question 4.

²³⁴ ISPs also raised concerns about the lack of advance notice surrounding the Call of Duty gaming download.

- 6.45 Moreover, as traffic levels increase, and ISPs invest to increase the capacity of their networks, it is important they are able to optimise those networks, to support network efficiency.
- 6.46 We acknowledge that the impact of traffic peaks may vary across ISPs and that the impact can be localised to specific parts of the network. Some MNOs have indicated that congestion at some cell sites can be a more regular occurrence given the inherent capacity constraints and the operational obstacles to increasing capacity quickly.
- 6.47 We gathered high-level evidence on the incidence of congestion at cell sites from each of the MNOs. Each MNO has its own approach to assessing whether a cell site has congestion. However, at a broad level, congestion is reported at cell sites where network performance falls below a minimum level, and where this occurs a number of times during a month.
- 6.48 The evidence indicates that congestion is reported at a small minority of cell sites each month.^{235 236} However, we recognise that peaks may impact more cell sites but less frequently and therefore these sites are not reported as congested.

The net neutrality framework needs to be clear and fit for purpose to meet future demands

- 6.49 We have a number of policy interventions designed to promote, to the greatest extent possible, network-based competition among ISPs.
- 6.50 Overall, we consider that our approach has worked well in driving investment, and facilitating our objective to safeguard well-run, efficient and robust networks. ISPs have been making significant investments to increase the capacity of their networks. This has allowed ISPs to meet the growth in traffic volumes and increases in peak usage across their networks in general with minimal adverse impact on network performance.
- 6.51 However, as explained above, we also recognise that there may have been a more localised impact of traffic peaks on network performance. In addition, there is uncertainty about how exceptional peaks may evolve in the future. Although this is not happening at the moment, where traffic becomes ‘peakier’ this will potentially increase the risks to network performance, including at a localised level.
- 6.52 While ISPs have made significant investments in their networks to meet traffic demands without traffic management, they have also said they are unclear about the rules. We recognise that uncertainty around the traffic management rules may have impacted the use (or lack of use) of traffic management by ISPs.
- 6.53 Akamai and Amazon suggested that allowing ISPs greater flexibility around traffic management will mean they will respond to high traffic events making unilateral judgements about restricting traffic, as opposed to planning for those events through cross-industry collaboration and capacity upgrades. We do not agree with these arguments. Firstly, our conclusions around traffic management, as reflected in our guidance, are intended to ensure that traffic management can contribute to ensuring that ISPs can run

²³⁵ BT Group/EE response dated 31 May 2023 to the RFI dated 18 April 2023, Question 9; Vodafone response dated 31 May 2023 to the RFI dated 18 April 2023, Question 9; Three response dated 31 May 2023 to the RFI dated 18 April 2023, Question 9; Virgin Media O2 response dated 22 May 2023 to the RFI dated 18 April 2023, Question 9.

²³⁶ [§<].

their networks efficiently and effectively, as opposed to replacing the important roles of collaboration with content providers and continued investment in networks. Secondly, the rules themselves already constrain how traffic management can be applied, and therefore we are only seeking to provide clarity within the rules, in particular that ISPs must take into account the technical characteristics of the traffic, and must be transparent on how they use this information.

- 6.54 [X] was concerned that there could be different interpretations of ‘exceptional’ and ‘imminent risk of congestion’ under our guidance. We consider this is a broader point around how prescriptive the guidance ought to be. Our guidance aims to provide greater clarity over how and when traffic management can be used. While we recognise that there may be some difference, albeit limited, in the interpretation of the rules, we also consider that a more prescriptive form of guidance risks being too inflexible given the circumstances in which traffic management may need to be used.
- 6.55 In summary, we consider that it is important that ISPs have clarity on the application of traffic management rules. This will ensure that their networks are run in an efficient and robust manner, as the demands on their networks evolve, and are generally fit to meet the needs of citizens and consumers in the future.
- 6.56 Therefore, we are providing further clarity in relation to the following areas:
- traffic management as part of contributing to network efficiency; and
 - traffic management to address congestion (or imminent congestion).
- 6.57 In Section 7, we provide our conclusions on the approach to traffic management to enable retail offers with different quality standards.
- 6.58 Some ISPs have suggested that Ofcom could take a leading role in bringing ISPs and content providers together to agree principles and guidelines to ensure content is delivered as efficiently as possible, and which could potentially form a Code of Practice. For example, this could include guidance relating to traffic forecasting and traffic identification; and help bring industry together to agree technical standards on how traffic is delivered.
- 6.59 Our view is that, in general, ISPs, content providers, and the networks that deliver traffic such as CDNs are coordinating with each other to deliver traffic. However, we recognise that several ISPs have provided evidence of traffic events where this has not happened, for example in relation to the timing of the delivery of traffic which resulted in large peaks and/or a lack of advanced warning relating to the delivery of content.
- 6.60 We consider our conclusions in this section, that are reflected in our updated guidance, provide ISPs with further flexibility to manage their networks more efficiently. We expect that discussions between different parties in the value chain will include any new approaches implemented by ISPs based on our updated guidance and that content providers will take this into account when considering how best to deliver their traffic. We consider this approach, with parties bilaterally agreeing the best options for their specific circumstances, should be effective in supporting the efficient delivery of traffic.²³⁷
- 6.61 Therefore, we will give further consideration as to whether an industry forum is appropriate once our updated guidance is in.

²³⁷ We note that BT is currently speaking to various interconnect partners about its interconnection policy and possible different approaches to efficient traffic delivery.

Traffic management measures that contribute to improving network efficiency

- 6.62 Our 2022 Consultation primarily focused on traffic management as part of addressing congestion or imminent congestion, as opposed to reasonable traffic management measures that contribute to network efficiency. This is because under Article 3(3) of the Regulation, the ability to use reasonable traffic management, whereby categories of traffic are treated differently based on the technical characteristics of that traffic, is contingent on ISPs' being able to identify that traffic accurately and without monitoring the specific content of that traffic (i.e. the packet payload). Our understanding at that time was that ISPs were unable to consistently identify and categorise traffic on their networks, which in effect meant they would be unable to implement reasonable traffic management measures to any significant extent.
- 6.63 Following the publication of our 2022 Consultation, we have engaged with ISPs to discuss the concerns they raised in their responses around their flexibility to manage traffic effectively under our proposed guidance. As part of that engagement, we discussed recent developments in traffic identification systems and technology which led us to also engaging directly with equipment and technology providers.
- 6.64 The discussions with ISPs and equipment and technology suppliers indicate that technology is now available that allows traffic to be identified by category, with a high degree of accuracy, using techniques that do not rely on monitoring the specific content of the traffic. Instead, these techniques rely on technology that monitors the characteristics (or signature) of traffic that can then be mapped to an application that enables the category of traffic to be identified.
- 6.65 These developments potentially allow ISPs to implement reasonable traffic management measures more viably.²³⁸ We are therefore providing further detail about how reasonable traffic management can be used.
- 6.66 Virgin Media O2, Vodafone and Three were concerned that, under our proposed interpretation of the rules, ISPs would be unable to use traffic management and that traffic management was seen as an exceptional measure, when a network is at risk of ceasing to function, as opposed to a routine component of efficient network management.
- 6.67 We consider that our guidance around reasonable traffic management now directly addresses this point and provides ISPs with the flexibility to use traffic management more routinely to manage peak traffic and contribute to network efficiency, as discussed further below.

Reasonable traffic management can contribute to network efficiency

- 6.68 Reasonable traffic management can support ISPs to efficiently use and optimise their network by apportioning the available network resources based on the quality requirements of traffic.

²³⁸ We recognise that other approaches to identifying traffic could also contribute to enabling ISPs to identify traffic, such as where a packet is marked at source by a content provider.

- 6.69 In practical terms, it allows ISPs to use network rules that determine how quickly packets belonging to different categories of traffic are processed in the network (as opposed to treating all traffic the same) based on the technical requirements of that traffic. In effect, this reappropriates the available network resources between different categories of traffic, so that different quality of service²³⁹ can be assigned to different categories of traffic with the aim of achieving good quality of experience²⁴⁰ for each of the different categories.
- 6.70 By way of a simple example (only), an ISP may have two categories of traffic being delivered on its network each with different quality of service requirements:
- **Category 1:** video conferencing which is a low proportion of total traffic volumes with low latency requirements (i.e. higher quality of service needs); and
 - **Category 2:** file downloads which are a high proportion of total traffic volumes without low latency requirements (i.e. lower quality of service needs).
- 6.71 Without reasonable traffic management, all packets of traffic (i.e. video conferencing traffic and file download traffic) would be processed in a queue by the network on a first-come first-served basis. However, as file download traffic volumes increase, even if there is sufficient overall capacity to process all traffic, the increasing volume of file download traffic may delay video conferencing traffic being delivered so that it is unable to achieve its low latency requirement.
- 6.72 Using reasonable traffic management, the network resource can be assigned differently to the two categories of traffic to meet their technical requirements (e.g. latency, packet drop rate) and allow for the successful delivery of each category of traffic.
- 6.73 In this example, the reassignment of network resource from file download traffic to video conferencing traffic, effectively allows video conferencing traffic to jump the queue and achieve its low latency. Furthermore, since file download traffic is less latency sensitive, and where there are low volumes of video conferencing traffic, the reassignment of network resources to video conferencing traffic would not materially impact the delivery of file download traffic.
- 6.74 ISPs typically build their networks to have sufficient capacity to deliver traffic at peak levels, which drives the level of investment. Over the longer term, reasonable traffic management can improve network efficiency since investment that might otherwise have been needed in the network to increase network capacity, can be avoided (or deferred).

Criteria for allowing reasonable traffic management

- 6.75 Under the Regulation, for a traffic management measure to be considered reasonable, it must meet all of the following criteria:
- i) The measures must be transparent, non-discriminatory and proportionate;
 - ii) The measures must not be based on commercial considerations but on objectively different technical quality of service requirements of specific categories of traffic;
 - iii) The measures must not monitor the specific content; and

²³⁹ Quality of service refers to the technical metrics that describe the characteristics of a network service, such as delay, jitter, packet loss, throughput, and availability.

²⁴⁰ Quality of experience refers to the end user experience of using a particular digital service, e.g. audio quality or call drop rate in the case of telephony, or smoothness of video playback in the case of video streaming.

- iv) The measures must not be maintained for longer than necessary.

Proportionality

- 6.76 The traffic management measure must be proportionate. As such, it has to be suitable to achieve the aim of contributing to an efficient use of the network and to an optimisation of overall transmission quality (with appropriate evidence to show it has that effect) and must be necessary to achieve this aim.
- 6.77 The starting point of the traffic management framework is that all traffic is treated equally. Where ISPs apply measures that depart from this, they should use the measure that most effectively addresses the concern while minimising the impact on other traffic and other users.
- 6.78 The Regulation also states that blocking, slowing down (i.e. throttling), altering, restricting, interfering with, degrading or discriminating between specific content, applications or services or specific categories of traffic are not permitted under reasonable traffic management.²⁴¹

Transparency

- 6.79 It is important that customers are made aware of how traffic management is applied on a network, under which circumstances, and how this might be expected to impact the service they receive. This information will help customers make informed choices between competing retail packages on offer.
- 6.80 We set out our conclusions on the transparency we expect ISP to provide towards the end of this section, which is also reflected in our guidance.

Measures based on objectively different quality of service requirements of specific categories of traffic and not on commercial considerations

- 6.81 As set out earlier, to be considered reasonable, a traffic management measure has to be based on objectively different technical quality of service requirements of specific categories of traffic, such as latency, jitter, packet loss, or bandwidth. For example, one category of traffic may consist of real-time applications that cannot tolerate delays between the sender and receiver.
- 6.82 There may be other reasons why ISPs might seek to prioritise certain content, including due to commercial incentives. However, the Regulation explicitly prohibits traffic management to be based on commercial considerations. For example, an ISP is not allowed to define a category of traffic based on whether it charges to deliver that traffic (since this would not be based on the objective technical characteristics of the traffic). Similarly, an ISP is not allowed to define a category of traffic based on a certain application or where it partners with providers of certain applications.

²⁴¹ As explained below, under our guidance, a traffic management measure is likely to be non-discriminatory where traffic with similar quality of service requirements is treated according to its objective technical requirements.

Non-discriminatory treatment of traffic

- 6.83 A traffic management measure is likely to be non-discriminatory where traffic with similar technical quality of service requirements receives similar treatment while traffic with objectively different technical quality of service requirements is treated differently, in line with the differences in technical requirements.

The challenges of identifying traffic

- 6.84 ISPs have told us that they are unlikely to be able to identify 100% of traffic consistently, and as a consequence they have generally not used reasonable traffic management measures in order to avoid inappropriately discriminating between equivalent types of traffic.
- 6.85 There are two approaches that might support traffic identification, each of which has its associated challenges.
- 6.86 Under the first approach the ISP identifies traffic using information included in the packet header that is added by the content provider (more specifically the information that is contained in the DSCP field).^{242 243} While this approach is technically feasible, traffic identification by the ISP depends on information contained in the packet header that is added by the content provider. There is currently no agreed standard for marking traffic using this field, or mechanism to police such markings. Therefore, significant coordination between ISPs and content providers would be needed before this approach could be used.
- 6.87 Some stakeholders have raised concerns around ISPs implementing voluntary traffic classification programmes with content providers, to support traffic identification since this could favour large incumbent content providers. We recognise that since this approach relies on coordination between ISPs and content providers it is likely to be most feasible where there is direct interconnect between the ISP and content provider and more challenging for traffic delivered via transit, public interconnect exchanges, or via third party CDNs, which could favour larger content providers. However, as this approach is unlikely to enable ISPs to identify a significant share of traffic, we do not consider ISPs will be able to pursue this approach.
- 6.88 Under the second approach the ISP would identify and mark traffic in real time as it enters the network.
- 6.89 While traffic might be identified through monitoring the information contained in the packet header, more accurate identification has traditionally required information in the packet payload (e.g. webpage content, videos) to be monitored, for example, through DPI techniques. We note that Akamai raised concerns about ISPs developing DPI techniques to enable traffic management. To be clear, as set out below and reflected in our guidance, ISPs are explicitly prohibited from monitoring specific content.
- 6.90 As set out above, since we published our 2022 Consultation, we have become aware of recent developments in technology that enable traffic to be identified by an ISP that does not rely on inspecting specific content (i.e. the packet payload), but monitors instead the characteristics of the traffic in order to assign it to a particular category.

²⁴² For downstream flow traffic, packets will be marked by the content provider, whereas upstream flow traffic will be marked by the consumer-side application.

²⁴³ Differentiated Services Code Point (DSCP) - a field in the header of an IP packet that allows quality of service information to be attached to the packet.

- 6.91 Based on discussions with equipment vendors, our current understanding is that this technology is able to identify a high proportion (up to around 95%) of traffic. Therefore, only a small proportion of traffic would be unidentified. Unidentified traffic may include:
- **New applications:** where a new application is launched, its packet signature will need to be reported in the database before its traffic can be identified. Therefore, there is always likely to be some traffic, where a signature match to the database cannot be made (since there will inevitably be a lag between an application being launched and the database being updated).
 - **Encrypted traffic:** traffic that is encrypted (e.g. delivered via a VPN) may be more difficult to identify accurately. While we anticipate that traffic identification techniques will continually improve so that encrypted traffic can be identified with increasing accuracy over time, we also acknowledge that new encryption techniques may be introduced at the same time. This may mean that at any point in time, some encrypted traffic cannot be identified accurately, as improvements in identification catch-up to the new encryption techniques.
- 6.92 While there are different approaches to identifying traffic (and others may be developed in the future), our view of the practicability of being able to identify traffic has evolved since our 2022 Consultation. In particular, technology would now appear to be available that makes it likely that ISPs are able to identify a high proportion of traffic on their networks (and without monitoring the specific content of traffic).

Balancing the objectives of protecting the open internet and supporting network efficiency

- 6.93 In light of the above, we have considered whether an approach where the vast majority of traffic is identified accurately is likely to meet the criteria to use reasonable traffic management while also furthering our objective of supporting well run, efficient and robust networks.
- 6.94 We consider that where ISPs are able to identify the vast majority of traffic then this would also allow the vast majority of traffic on their network to be optimised and therefore support network efficiency. As such, we consider that an overly strict approach to identifying traffic, which did not allow reasonable traffic management where the vast majority of traffic was identified, on the basis that some traffic was unidentified, would be inconsistent with our efficiency objective and would ignore the practical limits of identifying traffic accurately.
- 6.95 We recognise that where ISPs apply reasonable traffic management when not all traffic is identified accurately could raise concerns over the non-discriminatory treatment of traffic. For example, it might mean that some quality-of-service sensitive traffic may be mis-identified as not quality of service sensitive and deprioritised, which might undermine user quality of experience and more generally, adversely impact the ability of the affected content providers to compete on merits and innovate.
- 6.96 However, we consider that the potential risks and impacts are likely to be low for the following reasons. Firstly, the proportion of traffic that is unidentified would be low (and we set out below how we expect this traffic to be treated) which mitigates the overall impact. Second, as part of our approach to monitoring, we expect ISPs to be able to objectively justify where traffic cannot be identified; and have processes in place to continually improve the effectiveness of their traffic identification which will mitigate any risks that might arise.

- 6.97 Overall, we consider that an approach where the vast majority of traffic is identified accurately, and given the other guidance we set out in this section, provides a reasonable balance to meeting our objectives. Therefore, under the approach we are adopting and that is reflected in our guidance, we are unlikely to be concerned when an ISP uses reasonable traffic management which categorises traffic according to its objective technical characteristics, when:
- the vast majority of traffic is identified accurately, and
 - unidentified traffic is treated appropriately (as set out later in this section).
- 6.98 We are not indicating the technical approach (or approaches) or technology that should be used to identify traffic. Indeed, ISPs can choose not to implement traffic identification or not use reasonable traffic management at all.
- 6.99 We recognise that in practice the precise approach to identifying traffic is likely to vary between ISPs. However, we generally expect the approach used to achieve a level of accuracy that is broadly consistent with the most effective technology and techniques currently available.
- 6.100 We are not indicating the precise proportion of traffic that must be identified as a minimum under which reasonable traffic management is unlikely to raise a concern. However, we expect ISPs to apply reasonable traffic management only where the vast majority of traffic is identified. By way of illustration, our discussions with equipment vendors suggest that up to around 95% of all traffic can be identified with new technology that monitors the packet signature (i.e. without inspecting the packet payload).
- 6.101 We recognise that there could be practical issues of identifying all traffic. For example, because of a time-lag of identifying traffic which is subject to a new form of encryption; or traffic that relates to a new application which has yet to be fully identified. Therefore, where a particular source of traffic is not identified, we anticipate that this should be for a temporary period only. Overall, we would expect that non-identified traffic is by exception, limited and can be objectively justified.
- 6.102 We expect that:
- ISPs have appropriate processes in place to verify the accuracy of their approach to identifying traffic; and
 - ISPs update the techniques and systems used to identify traffic in a timely manner in line with technological developments and with the objective of improving the effectiveness of their traffic identification.

Ensuring an appropriate approach to traffic categorisation and treatment of unidentified traffic

- 6.103 Under the approach set out above, we are not indicating which categories of traffic should be used under reasonable traffic management. Instead, ISPs may determine the categories of traffic that achieves the aim of contributing to an efficient use of the network and to an optimisation of overall transmission quality, subject to meeting the criteria in the Regulation as referenced in paragraph 6.75.²⁴⁴

²⁴⁴ 5G standards incorporate an approach to differentiating treatment of traffic based on its characteristics through quality parameters (e.g. the 5G Quality Of Service Identifier (5QI)). MNOs may use this approach in determining traffic categorisation and different treatment of these categories in line with the Regulation.

6.104 We anticipate that a small minority of traffic might not be accurately identified which will mean it cannot be categorised based on its technical characteristics.²⁴⁵ In this case, we expect:

- Non-identified traffic to comprise a single category of traffic (where all traffic is treated equally).
- An ISP should allocate network resource to this traffic that can reasonably be argued to be consistent with the criteria under paragraph 6.75. In this regard, we would not expect non-identified traffic to be given a priority below that awarded to the category of identified traffic with the lowest priority. To be clear, this does not mean that by default non-identified traffic is given the same priority as the lowest priority traffic. Where the quality of service of identified traffic given the lowest priority is unlikely to be representative of the quality of service of non-identified traffic (for example where this is based on the specific category of traffic being particularly insensitive to latency, jitter or packet loss), then ISPs should take this into account in their treatment of non-identified traffic.

6.105 For example, an ISP might identify three categories of traffic based on their objective technical characteristics:

- **Category 1:** livestream traffic which is highly time sensitive i.e. very low latency requirements;
- **Category 2:** traffic with average latency requirements; and
- **Category 3:** large file download traffic that is not time sensitive i.e. none or limited latency requirements.

6.106 In addition, all non-identified traffic would need to be treated equally. We would not expect non-identified traffic to be treated the same as traffic with strict requirements such as the Livestream traffic. However, given that non-identified traffic is likely to comprise traffic relating to a range of applications with different quality of service requirements, it is also unlikely to be appropriate to assume the traffic has limited latency requirements and should be treated the same as Category 3. As such, it is likely to be most appropriate to treat non-identified traffic the same as Category 2.

6.107 Amazon raised a concern that, because of ubiquitous encryption, ISPs might not be able to reliably distinguish between different categories of traffic, and as a result could make errors about which traffic is prioritised or deprioritised.

6.108 We acknowledge that encryption and/or new forms of encryption may make identification more difficult and encrypted traffic may be more likely to be unidentified than other, non-encrypted traffic. However, we recognise the importance of end users being able to choose to protect their traffic by using encryption. Furthermore, we would not want ISP's choice of how to prioritise non-identified traffic to have implications on content providers' encryption of traffic or on end-users' choices around using encryption (e.g. VPNs).

6.109 Our understanding is that it is possible for the technical characteristics of the vast majority of traffic (including encrypted traffic) to be identified accurately using existing techniques.

6.110 As set out above, we therefore expect ISPs to have appropriate processes in place to verify the accuracy of their approach to identifying traffic and to update the techniques and

²⁴⁵ This could comprise of traffic relating to a range of applications with different quality of service requirements.

systems used to identify traffic in a timely manner. If identification techniques continue to evolve and improve, encrypted traffic (and indeed non-encrypted traffic) may only be unidentified for a temporary period only.

Specific content should not be monitored

- 6.111 Under the Regulation, reasonable traffic management does not permit the monitoring of specific content (i.e. transport layer protocol payload). For example, specific content provided by end users themselves, such as text, pictures and video is not allowed to be monitored.
- 6.112 Monitoring techniques which rely on the information contained in the IP packet header, and transport layer protocol header (e.g. TCP) may be deemed to be generic content.

Measures are not maintained longer than necessary

- 6.113 Reasonable traffic management measures may be configured in the network (or parts of the network) on a permanent basis. However, we would expect that the measures only take effect, and have an impact, as the network becomes loaded and approaches its maximum capacity.
- 6.114 Since parts of the network might become loaded at different times and frequency, we anticipate that reasonable traffic management measures may also be applied or impact specific parts of the network differently.

Traffic management measures to address congestion (or imminent congestion)

- 6.115 There may be times where networks face congestion or are expected to face congestion.
- 6.116 We consider that part of the network is congested where the underlying network or network component (such as a link, node or cell site) 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 latency;
 - maximum jitter;
 - maximum packet loss; and / or
 - utilisation.
- 6.117 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.
- 6.118 Where congestion occurs, it may undermine the functioning of large segments of the network, or in the most extreme cases, an entire network. The impact on customers can therefore be severe.

In some specified circumstances, ISPs may need to address congestion through additional measures that go beyond reasonable traffic management

- 6.119 Alongside investing in networks to meet capacity demands, we consider that reasonable traffic management should provide ISPs with the day-to-day flexibility to manage traffic on their networks and help minimise the occurrences and impacts of congestion that may arise due to traffic growth and increases in traffic peaks.
- 6.120 However, there may be specific circumstances where reasonable traffic management is insufficient to address the undesirable outcomes of congestion. This can occur even where there are appropriate competitive pressures and incentives for ISPs to invest in networks to meet capacity demands. In these circumstances, it may be necessary to take additional measures that go beyond reasonable traffic management.
- 6.121 The Regulation refers to two types of congestion – exceptional and temporary congestion. We consider that these can be described as follows:
- **Exceptional congestion** refers to unpredictable and unavoidable situations of congestion, such as that caused by a technical failure due to a broken cable, or unexpected changes in routing of traffic due to an emergency. Such congestion problems are likely to be infrequent, but may be severe, and not necessarily of a short duration.
 - **Temporary congestion** refers to specific situations of short duration, where a sudden increase in the number of users in addition to the regular users, or a sudden increase in demand for specific content, applications or services, may overflow the capacity of some elements of the network.
- 6.122 While ISPs are required to treat equivalent traffic equally (and our guidance relating to traffic identification continues to be relevant), additional flexibility in traffic management is allowed:
- through measures such as throttling, slowing, interfering, and blocking traffic that are allowed where these are necessary; and
 - in contrast to the requirements relating to reasonable traffic management, an ISP can apply traffic management to a category of traffic that is not related to its quality of service requirement (for example, not assigning sufficient capacity to a category of traffic to meet its quality of service requirement where this category of traffic is flooding the network).
- 6.123 ISPs must address exceptional congestion or temporary congestion in the least intrusive manner and reflective of the severity of the congestion. Further to this:
- Blocking traffic would typically be regarded as more severe than throttling or slowing traffic and therefore we would expect to see blocking only in very limited circumstances.²⁴⁶
 - Traffic management should be targeted at the affected parts of the network (i.e. parts of the network which are congested or where congestion is imminent). For

²⁴⁶ We expect blocking to be more applicable to the other exceptions in Article 3(3) such as illegal content or security measures, rather than in managing congestion.

clarity, where congestion is isolated to traffic on a dedicated link from a single content provider, action can and should be localised to this.

- Any measures should not be maintained longer than is necessary to mitigate the impact of congestion or imminent congestion.

6.124 [X] was concerned that there could be different interpretations of ‘exceptional’ and ‘imminent risk of congestion’ under our guidance. We consider that our updated guidance provides sufficient clarity over what is meant by ‘exceptional’ and ‘imminent risk of congestion’. As discussed earlier, while we recognise that there may be some difference, albeit limited, in the interpretation of the traffic management rules, we also consider that a more prescriptive form of guidance risks being too inflexible given the circumstances in which traffic management may need to be used.

Congestion on mobile networks

6.125 Three and Vodafone set out that growth in traffic poses particular problems on mobile networks given the greater capacity constraints faced compared to fixed ISPs. They expressed concerns that they are not permitted to effectively manage traffic in times of congestion since they cannot invoke exceptional traffic management if the network is frequently congested and therefore recurrent congestion must be addressed through expanding capacity.

6.126 We consider that along with investment to increase capacity, reasonable traffic management should be used to minimise congestion resulting from traffic growth and increases in traffic peaks. Furthermore, we consider that our updated guidance around reasonable traffic management provides greater clarity on how it can be used which will improve its effectiveness.

6.127 We acknowledge that mobile networks by their nature are subject to more variable conditions than fixed networks, such as physical obstructions, lower indoor coverage, or a variable number of active users with changing location. Furthermore, in some instances there may be practical difficulties to increasing capacity at cells sites, such as finding an appropriate location for a site, gaining the necessary permission to build at the site, or building the site.

6.128 These issues mean that incidences of congestion are more frequent on mobile networks than for fixed networks, and increasing the capacity of the network to alleviate congestion at particular cell sites may be more difficult. As a consequence, additional traffic management measures may be needed to address exceptional or temporary congestion at some cell sites on an extended (though not long-term) basis.

6.129 In general, we would expect the normal planning processes of the mobile network operator to address growth in traffic in a timely fashion through capacity expansion. Therefore, the use of additional traffic management measures to address congestion on an ongoing basis should be limited to cell sites where capacity expansion is not practical in the short to medium term. This approach should not be needed to address increasing traffic volumes on the vast majority of cell sites. Use of these measures across the network more generally on a regular basis is unlikely to be consistent with the rules.

Allocating network resources to users during congestion

6.130 Vodafone argued that mobile networks, in particular, need to be able to manage congestion by applying fair usage policies, where the congestion is caused by specific users that use the network at a high intensity.

6.131 We recognise that in some instances heavy network usage by specific users can cause network congestion that is to the detriment of other users. In these circumstances, and subject to being fully transparent to customers and complying with Article 4 of the Regulation, we consider that where ISPs (either mobile or fixed) manage the allocation of network resources between users to mitigate the impact of congestion and ensure a more equitable allocation of network resource between users, this is unlikely to be a concern under our guidance.

The case for traffic management that is focused on specific content providers is less clear

6.132 In our 2022 Consultation, our understanding was that ISPs could not identify traffic of similar categories consistently and therefore the scope for them to apply reasonable traffic management measures was more limited. In particular, they were unable to target traffic management measures, for example, on less time or quality sensitive traffic or traffic generating congestion.

6.133 Given this, we considered that there could be merit in allowing ISPs flexibility to apply traffic management at a more focused level, for example on specific content providers, in order to improve consumer quality of experience or, in times of congestion, prevent or mitigate the harmful impacts on consumers.

6.134 We recognised that this more focused approach could raise risks, however, we considered that these might be mitigated through appropriate proportionality, transparency, monitoring and enforcement requirements. We also acknowledged that a more focused approach would require a change to legislation which would be a matter for Government and Parliament.

6.135 As set out above, our guidance now provides ISPs with further flexibility to use traffic management to both optimise their networks and address congestion based on our understanding of the practicalities of their ability to identify traffic consistently.

6.136 We consider that to a large extent this further flexibility may achieve the benefits that we envisaged might arise from a more focused approach to traffic management in our 2022 Consultation.

6.137 Overall, we consider there could be benefits to allowing a more focused approach to address congestion, provided the appropriate mitigating measures are put in place to address any potential concerns. However, this would be an area for further review in the future once ISPs have updated their approaches to traffic management based on our updated guidance.

6.138 Ultimately, this approach would require a change to legislation which would be a matter for Government and Parliament.

Transparency to customers

6.139 As discussed above, ISPs have flexibility in managing traffic on their networks both as part of improving efficiency and mitigating congestion or imminent congestion.

6.140 It is important that customers are made aware of how traffic management is applied on a network, under which circumstances, and how this might be expected to impact the service

they receive. This information will help customers make informed choices between competing retail packages on offer.

6.141 There is uncertainty about the types of retail packages that might be developed and offered in the future. Therefore, we cannot be precise about the information that we expect to be provided in all cases. Notwithstanding this, where ISPs are using traffic management measures, we would generally expect the following information to be made available to retail customers:

- description of each category of traffic;
- explanation of traffic management measures applied, where there is no congestion, including explanation of times when traffic management is applied (e.g. busy hours), and the impact on each traffic category, as predefined in traffic management rules; and
- explanation of additional traffic management measures applied when there is congestion on the network, in particular the impact they have on different traffic categories and end-users (for example, that they are used to give an equitable allocation of network resources to end-users during network congestion).²⁴⁷

6.142 ISPs will also need to make sure their practices comply with the requirements in relation to meeting contracted levels of quality, laid down in Article 4 of the Regulation.

Our approach to monitoring and reporting

6.143 It is important that we are able to monitor the application of traffic management practices to ensure that they meet our guidance and deliver against our objectives. Therefore, there needs to be sufficient information and data available from ISPs to allow us to do this.

6.144 In light of Ofcom's supervision and enforcement duties set out in Article 5 of the Regulation, our guidance sets out that where an ISP starts using traffic management to treat different categories of traffic differentially, they are expected to provide us with their Traffic Management policy on request.

6.145 We would expect an ISP's Traffic Management policy to include the following:

- details of the internet access services that the policy pertains to;
- what traffic management practices will be used and the particular circumstances where these practices would take effect;
- where different traffic (or categories of traffic) is treated differently:
 - > description of the approach used to identify traffic;
 - > categories of traffic identified and an explanation of their technical characteristics;
 - > proportion of total traffic that is identified;
 - > reasons why traffic is not identified;
 - > how traffic that is not identified is treated; and
 - > description of systems used to identify traffic including the approach to updates to improve accuracy of identification.

²⁴⁷ We note that Akamai highlighted the importance of robust transparency requirements including notifications about when a network is congested and the categories of content that are deprioritised to manage that congestion.

- where the ISP offers multiple internet access services, the different approaches taken for each service, and how this approach is used to deliver the contracted quality levels where these apply.
- 6.146 Vodafone, KCOM and Virgin Media O2 raised concerns that our proposed approach to reporting created a burden for ISPs and could act as a disincentive to use traffic management.
- 6.147 We recognise that our approach to monitoring and reporting can create a burden for ISPs (and Ofcom) and needs to be proportionate to the potential risks. As such, we have decided to adopt a different approach to monitoring reasonable traffic management and additional traffic management to address congestion.
- 6.148 In relation to reasonable traffic management, we anticipate that an ISP's Traffic Management policy (including the approach to identifying and categorising traffic in line with the expectations set out above where relevant) will be sufficient to explain how it is applied and how it meets the requirements in the Regulation. As such, where only reasonable traffic management is used, we do not expect to routinely collect further information, and therefore will only seek additional information by exception.
- 6.149 We expect that additional traffic management measures to address congestion will be used on a relatively limited basis. However, given the potential impact on content providers and end-users, we expect ISPs to be able to provide information on request relating to each instance it is applied, including:
- the reason for using the additional traffic management measures;
 - the impact of the measures on traffic and network performance;
 - the specific traffic management measures that were applied and in which parts of the network;
 - the information used to determine that congestion was imminent or occurring;
 - and
 - the dates and times when the traffic management measure was applied.
- 6.150 Where the information above (for example in relation to the measures used or the approach taken to determine congestion was imminent or occurring) is in line with the traffic management policy, a reference to the policy is likely to be sufficient.
- 6.151 In the case of mobile access networks, where congestion may persist for longer periods, as described in paragraph 6.128, we would expect the ISP to provide data on its approach to managing traffic on the impacted cell site(s) in periods of congestion – we do not expect to gather data on each application of the additional measures unless we have specific concerns about the measure used or the impact of it.
- 6.152 Earlier in this section, we explained that where ISPs allocate network resources between users to mitigate the impact of congestion and ensure a more equitable allocation of network resource, this is unlikely to be a concern under our guidance. Where ISPs use these measures, we would expect them to be able to provide Ofcom with details of their application on request.
- 6.153 We plan 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, in our annual monitoring report to facilitate further transparency.

6.154 Section 12 sets out the process we expect to take for our monitoring work. Annex 1 sets out our full guidance for monitoring and reporting.

Interaction between traffic management and related areas

6.155 In Section 7, we set out our conclusions relating to differentiated retail offers. We explain that under the Regulation, ISPs can offer:

- Retail offers which provide different levels of quality of service for different ISP subscriptions. 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 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.

6.156 We also explain 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, the Regulation does not prohibit that.

6.157 In Section 8, we set out our conclusions regarding traffic management in relation to internet access on transport and in other public spaces. In addition, we also set out conclusions in relation to exceptions where there is a public interest.

6.158 In Section 9, we set out our conclusions regarding the treatment of traffic and users of internet access services using the terminal equipment of their choice.

7. Differentiated retail offers for internet access services

Introduction

- 7.1 In this section, we present our analysis and conclusions on retail offers for internet access services that provide different levels of service under the net neutrality framework.
- 7.2 In summary, we have concluded that we should provide further clarity that ISPs can provide retail offers with different quality of service levels where this applies to all the content and services accessed by consumers purchasing the offer (application-agnostic offers)²⁴⁸, but that they cannot provide retail offers that apply a different quality of service to different content (content-specific retail offers).
- 7.3 It is important that ISPs provide consumers with sufficient transparency about their retail offers. It is also important that we have sufficient information and data that allows us to monitor these offers. We set out how ISPs should meet their obligations to provide sufficient information to consumers and clarify our approach to monitoring.
- 7.4 Our new guidance setting out our updated approach is in Annex 1.
- 7.5 This section is structured as follows:
- we first outline the regulatory framework on differentiated retail offers;
 - we then outline our proposals relating to differentiated retail offers that were set out in our 2022 Consultation and summarise stakeholder responses to those proposals; and
 - finally, we provide our analysis (including our response to stakeholder comments) and decisions.

Background

Application of the net neutrality framework to differentiated retail offers

- 7.6 The commercial agreements between ISPs and end-users, including their retail customers, are 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). Where ISPs offer various retail packages with different levels of quality, any traffic management measures used to differentiate between the internet traffic of different retail packages will need to be compliant with the principles of traffic management set out in Article 3(3) of the Regulation.

²⁴⁸ These offers may either apply the same quality of service to all traffic for a given subscriber, or provide multiple quality of service levels within a single package, where the content delivered with different levels of quality of service is determined by the customer rather than the ISP.

7.7 Retail offers with different levels of quality 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.

Our 2022 Consultation

- 7.8 Our 2022 Consultation set out our proposal to clarify the scope for ISPs to offer retail products with different quality of service parameters (in addition to speed and data allowance), under the net neutrality rules, where:
- They are retail offers where the same quality applies to all the content and services accessed by a given subscriber.
 - They are retail offers that provide multiple quality of service levels within a single subscription where the level of quality of service is independent of the content and services accessed. These could 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.
- 7.9 Such quality of service parameters could potentially include jitter, latency, packet loss, guaranteed bandwidth, or variable quality of service levels dependent on the time of day or in response to the customer paying for ‘boosts’.
- 7.10 In each of the above cases, we set out that the ISP must provide sufficient transparency so that customers can understand the characteristics of each retail offer made available by an ISP. This is especially important given the risk that they might not be familiar with certain technical parameters of quality such as jitter, latency, or packet loss, which could lead them to make poor purchasing decisions. Such offers would also need to comply with the transparency measures set out in Article 4 of the Regulation.²⁴⁹
- 7.11 Our proposals clarified 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.
- 7.12 We explained that where an ISP launches a retail offer that provides a different level of quality of service (other than speeds), we would monitor their compliance with the Regulation to ensure that customers receive the performance of service they subscribe to. We also set out the data that we expected ISPs to routinely collect and be able to provide to us.²⁵⁰
- 7.13 We also considered that there may be benefits to allowing retail offers where specific content is treated differently (content-specific retail offers) for example a retail offer which would provide lower jitter for a particular video-conferencing application. While we recognised that there may be some scope for concerns arising from this, we considered that these risks could potentially be managed through case-by-case monitoring and enforcement

²⁴⁹ These require ISPs to ensure that all their customers can understand what is offered under different packages and how this might affect quality of experience and also to ensure that customers can take action where there are significant, continuous or regular discrepancies between actual performance and what has been agreed in the contract.

²⁵⁰ We proposed to periodically 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.

using a framework consistent with that proposed for zero-rating. However, this would require legislative change as these types of offers are not currently permitted.

Stakeholder responses

Retail offers with different quality standards

7.14 In general, ISPs (BT Group, Three, Virgin Media O2, Vodafone, TalkTalk) considered that our proposed guidance only set out what was currently permissible and welcomed the clarity that it gave to the differentiated retail offers that they could provide.²⁵¹

7.15 However, other responses raised concerns over our proposed guidance on differentiated retail offers:

- Some respondents (BBC and Cloudflare) raised concerns that if differentiated retail offers became commonplace, this could lead to a risk that those on more basic tiers would not be able to access all the services that they required without paying a premium, and/or that those on lower incomes would be prevented from accessing higher quality services and not be protected from poor service levels in the same way that they are currently. Therefore, there would be a risk that customers could have to upgrade to higher cost packages to receive the level of service that they have at present.²⁵²
- Cloudflare argued that there was also a risk that such offers could lead to a reduced incentive to invest in reducing congestion if customers were likely to be willing to pay for a premium retail offer and also that offering premium quality retail offers would be a change to the Regulation rather than a clarification, due to the fact that it involves prioritising traffic during congestion events based on extra payment.²⁵³
- The BBC argued that there was no evidence that the current position on retail offers was preventing ISPs from developing innovations in this area.²⁵⁴

7.16 Several stakeholders (Akamai, Amazon, Google, and Meta), stressed the importance of transparency and reporting requirements where ISPs offer differentiated retail offers to ensure customers can make informed choices.²⁵⁵ Amazon and Google considered that differentiating retail offers on anything other than speed was likely to be problematic to consumers in terms of comprehension of what they were purchasing and that there was a risk that customers would purchase plans which were not suited to their requirements.²⁵⁶

²⁵¹ [BT Group response](#) to the 2022 Consultation, para. 6; [Three response](#) to the 2022 Consultation, p. 9; [Virgin Media O2 response](#) to the 2022 Consultation, section 5.2; [Vodafone response](#) to the 2022 Consultation, response to Q5; [Talk-Talk response](#) to the 2022 Consultation para. 4.5.

²⁵² [BBC response](#) to the 2022 consultation, p.10-12; [Cloudflare response](#) to the 2022 Consultation, p. 3.

²⁵³ [Cloudflare response](#) to the 2022 Consultation, p. 3.

²⁵⁴ [BBC response](#) to the 2022 Consultation, p. 10.

²⁵⁵ [Akamai response](#) to the 2022 Consultation, response to Q5; [Amazon response](#) to the 2022 Consultation, pp. 7-8; [Google response](#) to the 2022 Consultation, response to Q6; [Meta response](#) to the 2022 Consultation, response to Q5.

²⁵⁶ [Amazon response](#) to the 2022 Consultation, p. 8; [Google response](#) to the 2022 Consultation, response to Q6.

Amazon also argued that customers might incorrectly attribute poor performance to their content service providers rather than being a result of their choice of plan.²⁵⁷

- 7.17 Some ISPs (BT Group, Vodafone and Virgin Media O2) raised concerns around the extent of the proposed monitoring and reporting requirements as part of our broader guidance and the risks of this on innovation, suggesting that reporting requirements should be proportionate to avoid operational burdens for ISPs and costs which are ultimately borne by customers.²⁵⁸ BT Group also argued that such requirements could act as a deterrent to launching such offers.²⁵⁹

Content-specific retail offers

- 7.18 There were opposing views about the case for allowing content-specific retail offers, which are currently not permitted under the rules.

- 7.19 In general, ISPs were in favour of allowing more flexibility in relation to retail offers:

- BT Group supported allowing prioritisation of content from specific content providers since tailored service provision, in competitive retail markets, was in consumers' interest. Although it did not see such changes as threatening the open internet, it indicated that if specific concerns were identified Ofcom could either issue further guidance or conduct targeted enforcement action.²⁶⁰
- Three said that allowing retail offers with a particular level of quality for specific services and content (e.g. a minimum data rate guarantee for Netflix customers) would have a greater impact if Three and Netflix were able to agree a charge to content providers for this service. Without a charging regime (and with ISPs unable to manage traffic for commercial considerations) they were unclear about the likely impact of the proposal.²⁶¹
- Vodafone referred to the variation in consumer priorities, range of devices, applications and consumer budgets. It argued that ISPs should have the ability and freedom to innovate and serve all customers. As such, it argued that unless there are competition concerns, regulation in a competitive market should not restrict ISPs from offering more targeted retail packages.²⁶² Similarly, Virgin Media O2 was in favour of permitting greater flexibility to offer retail packages arguing that it would deliver greater levels of innovation, choice and value to all in the internet chain.²⁶³
- Virgin Media O2 also noted that some stakeholders had raised concerns over the emergence of "fast lanes" that could be to the detriment of customers that relied on the "best efforts" internet i.e. more basic packages. However, it considered these concerns were erroneous. First, it said the competitive ISP market would incentivise those ISPs to maintain a good quality of service for the best-efforts packages. Second, it considered the concerns raised were from large content providers that had good hosting arrangements and so did not need additional

²⁵⁷ [Amazon response](#) to the 2022 Consultation, p. 8.

²⁵⁸ [BT Group response](#) to the 2022 Consultation para. 16-17; [Vodafone response](#) to the 2022 Consultation, response to Q6; [Virgin Media O2 response](#) to the 2022 Consultation, section 5.2.

²⁵⁹ [BT Group response](#) to the 2022 Consultation, para. 16.

²⁶⁰ [BT Group response](#) to the 2022 Consultation, para. 30-31.

²⁶¹ [Three response](#) to the 2022 Consultation, p. 13.

²⁶² [Vodafone response](#) to the 2022 Consultation, response to Q7.

²⁶³ [Virgin Media O2 response](#) to the 2022 Consultation, section 5.2.

prioritisation from ISPs. This contrasts with smaller content providers that could benefit from being able to enter arrangements with ISPs to enhance quality of service.²⁶⁴

7.20 However, other respondents expressed concerns about permitting this type of retail offer:

- Akamai opposed content provider specific retail offers on the basis this could stifle innovation and concentrate market power within a small group of well-resourced content providers.²⁶⁵ Amazon also raised similar concerns over impacting competition across content providers, and argued that if such offers were supported through charging content providers, this would be equivalent to paying for prioritisation.²⁶⁶ Google raised a similar concern and was not aware of any consumer content or provider that had sought a “fast lane” and said that “the latest content and applications function fully on an Open Internet connection.” For consumer services, it considered that a standard internet connection remained the best way to deliver the variety of services that consumers have been used to accessing.²⁶⁷
- Netflix was opposed to changing the underlying framework, which it said would likely precipitate well-established risks in pursuit of highly theoretical benefits, until the proposed changes to the guidance have been implemented and their impact thoroughly assessed.²⁶⁸
- The BBC said that allowing different quality levels for different content and services would go against the principles of an open internet, and there were real risks to consumers and competition which cannot be justified. It was especially concerned about any such change which led to traffic management measures being applied to PSB video content for those on lower quality packages, and the risk of undermining universal access to the BBC for audiences who may potentially already be underserved.²⁶⁹

Our analysis and conclusions

Retail offers with different quality standards

- 7.21 As set out above, the current net neutrality framework permits retail offers with different quality parameters (other than speeds), where these are the same for all content and services accessed on each retail package offered.
- 7.22 However, a lack of clarity about what is allowed by the current net neutrality rules means some ISPs may not be certain whether the rules permit such differentiation.
- 7.23 Currently, there are only very limited differentiated retail offers, but these may become increasingly important given changes in user demands and the services that are delivered.

²⁶⁴ [Virgin Media O2 response](#) to the 2022 Consultation, section 5.2.

²⁶⁵ [Akamai response](#) to the 2022 Consultation, response to Q7.

²⁶⁶ [Amazon response](#) to the 2022 Consultation, response to Q7.

²⁶⁷ [Google response](#) to the 2022 Consultation, response to Q7.

²⁶⁸ [Netflix response](#) to the 2022 Consultation, pp. 2-3.

²⁶⁹ [BBC response](#) to the 2022 Consultation, pp. 11-12.

- 7.24 In this section, we consider the potential benefits of such retail offers as well as the risks before reaching our conclusion, in which we explain why we are providing further clarity on what is allowed.

Potential benefits of retail offers with different quality standards

- 7.25 At present, ISPs offer a range of packages with reference to price, speed and data allowance but there are only limited retail packages with different quality parameters.²⁷⁰ We understand that more ISPs are considering offering these packages in the future. We consider that there are potential benefits from such offers. Although we recognise that there is uncertainty around the future take-up of new use cases, we generally accept the argument that developments in user needs and the content they want to access, as well as technology and the services ISPs can deliver, might lead to demand for retail offers which provide more diverse parameters or levels of quality.
- 7.26 Where retail broadband markets are competitive, ISPs will have a greater incentive to develop offers to attract customers with varied needs, which will in turn increase the degree of choice available to those customers. This could be in the form of offering a higher quality service to a subset of customers who are willing to pay a premium for it, or conversely, a more basic quality package at an affordable price. This has the potential to positively impact overall take-up of internet access services as a result.
- 7.27 Take-up of such services may also have a positive impact on innovation in content and services markets, for example by encouraging content providers to develop innovative solutions designed around different broadband quality levels.
- 7.28 Retail competition on quality parameters, and the prospect of attracting customers who are willing to pay a premium for higher quality services, could potentially be a driver for ISPs to invest in their networks to improve quality of experience. We have seen that differentiation in retail broadband markets on parameters such as speed has benefitted customers and driven investment in faster and more reliable networks. Differentiated retail offers have the potential to have a similar impact on 5G and fibre network roll outs, 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 business and residential customers).
- 7.29 Additionally, different quality tiers at different price points could encourage customers to explicitly consider what quality of experience they want and what price they are willing to pay for it. For example, some customers (in particular, business customers) may opt to pay a premium for a consistently higher quality of experience, but others may prefer to pay a lower price, if they use time or quality sensitive content and services (for example live streaming sports or high-quality video conferencing) less frequently or are willing to accept lower quality at peak times. This could in turn also reduce network usage at peak hours and so lower network costs and improve efficiency over the longer term.
- 7.30 We would expect the take up of such services to depend on 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. Willingness to

²⁷⁰ For example, [Starlink Roam](#) [accessed 18 October 2023].

pay for higher quality services may be higher among businesses than residential customers.²⁷¹

- 7.31 We believe that retail offers differentiated on the basis of quality have the potential to benefit consumers by providing increased choice that better meets their needs, and improve the potential for innovation and incentives for investment. We would therefore be concerned if such beneficial retail differentiation was prevented, or if ISPs were unclear that this was permitted.

Potential risks of retail offers with different quality standards

- 7.32 There are also a number of potential risks associated with such retail offers, many of which are associated with a lack of transparency for consumers about what the different quality of service parameters are and what this will mean for their internet experience.

Transparency and customer engagement

- 7.33 As set out in the 2022 Consultation, in the absence of conditions requiring transparency, limited information or a lack of effective customer engagement could create a risk that consumers make poor decisions as:

- Consumers generally tend to be less informed and engaged with information on quality of network performance than on price.
- Consumers might be less familiar with certain technical parameters of quality, such as jitter, latency, and packet loss, and might not fully understand how these parameters might affect their user experience.
- Quality of experience could also depend upon 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 could improve quality of experience when using video-conferencing applications but is unlikely to impact web browsing or sending emails.

- 7.34 Such a lack of transparency could potentially lead to customers choosing a package which is not suitable for their needs.

- 7.35 A lack of transparency could also have the effect of undermining the competitive pressure on ISPs to ensure a good quality of experience for their customers which would run counter to the objectives of safeguarding an open internet.

- 7.36 As set out above, several stakeholders raised concerns that differentiating retail offers on any parameters other than speed was likely to be problematic to consumers in terms of comprehension of what they were purchasing and that there was a risk that customers would purchase plans which were not suited to their requirements. We agree with respondents that transparency is important. In order to address these risks, we have set out in our guidance that ISPs can only offer such packages where sufficient transparency is provided in order that customers are able to understand what they would receive with these packages.

- 7.37 Specifically, such offers need to comply with the transparency measures set out in Article 4 of the Regulation, which include requirements on ISPs to ensure that their customers can understand what different packages offer and how this might affect quality of experience.

²⁷¹ Our research for the 2022 Consultation suggests some small businesses consider reliability and service to be more important than cost when deciding whether to stay or switch provider. Ofcom, 2022. [Qualitative research report](#) and [Appendix: Qualitative research report](#).

This could include both contracted performance standards on elements such as 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. Part C of the General Conditions also stipulates requirements for transparency, billing, and dispute resolution which providers would also need to comply with.

- 7.38 We believe that these requirements should be sufficient to enable customers to make informed choices about these retail offers, and be confident that they will receive the service that they are paying for. However, we also recognise that such offers will be new to the market, and at the moment it is unclear how widespread they will be or what the potential take-up may be. We will monitor the situation as such offers are introduced and may further review measures relating to transparency if necessary.

Other potential risks

- 7.39 As set out above, several stakeholders raised concerns that differentiated retail offers could lead to a risk that customers on basic tiers would not be able to access the services that they require without paying a premium, and may have to upgrade to a premium package to receive the level of service that they have at present. Cloudflare also argued that the introduction of differentiated retail offers could lead to a reduced incentive to invest in reducing congestion if customers were likely to be willing to pay for a premium retail offer.
- 7.40 We think that the likelihood of these risks occurring is low, due to the strong levels of retail competition observed between ISPs. These competitive pressures should help to ensure that there is not an incentive for an ISP to reduce the quality of its standard offer as customers would be likely to change providers. Likewise, the existence of strong competition means that ISPs should have continued incentives to invest to reduce congestion, in order to remain competitive. As discussed further below, we will also monitor any such retail offers as they are introduced.
- 7.41 Cloudflare also argued that such retail offers are, in effect, equivalent to paying for prioritisation, as some traffic is prioritised during periods of congestion based on payment.²⁷² We do not believe that this type of prioritisation is precluded under the rules (which prohibit paying to prioritise different categories of traffic within an internet access service) due to the fact that the prioritisation of traffic is determined on the basis of consumer choice (i.e. whether or not to opt for a premium offer). The traffic associated within each internet access service (retail offer) will therefore be treated equally.²⁷³
- 7.42 There is also a potential risk that the introduction of different quality of service tiers could lead to discrepancies between actual and contracted quality of service. In particular, there is a potential 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 receive.
- 7.43 We believe that this risk can be addressed through transparency and monitoring. We note we have an obligation to promote the continued availability of non-discriminatory internet access services at levels of quality that reflect advances in technology, and will take this into account when monitoring retail offers. In addition, where we have concerns about the quality of certain services, we may take actions including imposing requirements concerning

²⁷² [Cloudflare response](#) to the 2022 Consultation, p.3.

²⁷³ ISPs may still treat traffic differently based on its technical characteristics as set out in Section 6.

technical characteristics, minimum quality of service requirements and/or other appropriate and necessary measures on providers concerned.²⁷⁴

Monitoring requirements

- 7.44 As set out above, some ISPs (BT Group, Vodafone and Virgin Media O2) raised concerns about the extent of our proposed monitoring and reporting requirements, both relating to differentiated retail offers and also more generally. We disagree that our proposed additional monitoring is not required or is disproportionate. We are required to monitor and ensure compliance with the Regulation, and as and when ISPs develop new retail offers based on our updated guidance, we may need to assess the compliance of these with the Regulation. Our approach seeks to balance the burden on ISPs against providing sufficient assurance to Ofcom and stakeholders that ISPs are compliant with the rules.
- 7.45 The information that we intend to collect from ISPs for the purpose of monitoring retail offers includes a summary of the quality of service parameters attached to each offer, the information provided to consumers about the offer and any traffic management details related to the provision of the offer which are not included in the general traffic management policy. We may gather, on a case-by-case basis, information to determine whether customers understand the offers, or to determine where the approach may restrict access to certain content providers. This may include take-up or forecast take-up of different offers, information on complaints relating to specific offers and the impact of new services, such as increased congestion and the mitigating approaches being taken, where this is not clear from the general data collected on an ongoing basis.
- 7.46 We do not expect to gather data relating to differentiated retail offers from ISPs that do not offer them (other than confirmation that this is the case) and therefore there will be no additional burden on these ISPs. For those that do, we do not believe the provision of this data would be disproportionately burdensome to ISPs on the basis that we expect that they would be undertaking their own assessments of their offers and use of traffic management such that this information should be readily available. We will keep the data that we are gathering under review going forward to ensure that we are able to collect the information that we require with the minimum burden to ISPs necessary to meet our objectives and obligations. We explain our approach to monitoring in Section 12.

Use of traffic management with differentiated retail offers

- 7.47 We have set out in Section 6 our approach to traffic management. Where an ISP offers several retail offers with different quality of service parameters:
- It may use traffic management to treat the traffic of each offer differently, for example by prioritising the traffic of a premium offer above traffic of other offers. In this case, all traffic within each individual internet access service would be treated equally.
 - It may use reasonable traffic management to treat different categories of traffic differently within each internet access service (i.e. each different retail offer) as long as the approach for each offer individually meets the requirements of reasonable traffic management.
 - It may use measures going beyond reasonable traffic management to address cases of temporary or exceptional congestion where similar categories of traffic

²⁷⁴ Section 7 of the [Open Internet Access \(EU Regulation\) Regulations 2016](#) as amended by the [Open Internet Access \(Amendment etc.\) \(EU Exit\) Regulations 2018](#).

are treated equally within each internet access service (i.e. each different retail offer).

- 7.48 As such, where similar categories of traffic are treated differently between different retail offers, this would not necessarily be a breach of the net neutrality rules, as long as the ISP meets the requirements for traffic management for each individual retail offer and as long as the use of traffic management is made clear to the retail customers of each retail offer.

Conclusion on differentiated retail offers

- 7.49 We have decided to clarify our approach to differentiated retail offers by means of providing guidance clarifying that the following are permitted:

- Retail offers which provide different levels of quality of service for different internet access subscriptions. These are offers where the same quality applies to all content and services accessed by a given subscriber.
- Retail offers which provide multiple quality of service levels within a single subscription, where the content delivered by different levels of quality of service is determined by the customer (rather than by the ISP). An example of such a retail offer would be where 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.

- 7.50 This will be subject to ISPs providing sufficient transparency relating to their services and these services meeting the contracted level of service.

- 7.51 ISPs may apply traffic management on their network to deliver the level of quality of service under the different retail offers contracted as long as this traffic management meets the requirements discussed in Section 6.

Content-specific retail offers

- 7.52 Retail packages providing a particular level of quality for the traffic associated with specific content and services are not permitted under the current net neutrality framework. The provision of such offers would require ISPs to prioritise traffic from specific content providers, infringing Article 3(3) of the Regulation. Although there could be potential benefits associated with such offers, there would also be risks which, without sufficient mitigation, could lead to adverse outcomes for consumers.

- 7.53 As set out above, while several ISPs were in favour of allowing greater flexibility in relation to this type of retail offer, other respondents expressed concerns about permitting such offers on the basis that it was likely to impact competition across content providers and risked stifling innovation, as well as leading to risks for consumers.

- 7.54 As set out above, retail offer differentiation can have a number of potential benefits including increased choice for customers, positive impact on innovation in the content and services market, and an increased incentive for ISPs to invest in their networks to improve quality of experience. However, our approach to differentiated retail offers, taken together with our updated approach to reasonable traffic management, provides ISPs with a wide degree of flexibility in how they offer services to different types of consumers, and how they manage the traffic associated with these offers. On that basis, the incremental benefits of even more granular targeting of retail offers are less clear.

- 7.55 As several respondents noted, there would also be significant risks associated with allowing this type of retail offer, which, without mitigating measures, could lead to competition distortions and the restriction of consumer choice in the long run:
- concerns could arise from the ISP's gatekeeper position which could give ISPs a degree of market power over content providers and an ability to distort competition in content provider markets; and / or
 - larger content providers could have sufficient bargaining power to negotiate relatively more favourable terms from ISPs than smaller content providers, which could distort competition.
- 7.56 We recognise that these risks are potentially substantial and that the benefits associated with such offers (beyond what can be provided by permitted retail offers) are unclear. Although it is possible that such risks could be mitigated to some extent by case-by-case monitoring and enforcement, further exploration of this would be required. Any such monitoring would need to place weight on the following considerations:
- risks are more likely where an ISP and/or a content provider enjoy a degree of market power and may use it to undermine the open internet and open internet-based innovation (by directly restricting choice or distorting competition);
 - The ability and incentive to exclude or otherwise undermine competition from rival content providers will also depend on the extent to which it is essential for those content providers to be part of the premium quality offers to successfully compete; and / or
 - there may be greater concern if an ISP requires content providers to sponsor the higher quality scheme.
- 7.57 Overall, we consider there could be benefits to such an approach, but it is not clear to us that the mitigating measures for the potential concerns discussed above would be sufficient. This may be an area for further review in the future once the differentiated retail offers discussed above have been offered and assessed in line with the decisions and guidance set out in this statement.
- 7.58 As ISPs prioritising one content provider's traffic over another is prohibited by the current net neutrality rules, allowing content-specific retail offers would require a change to legislation which would be a matter for Government and Parliament.

8. Internet access on transport, in other public spaces, and public interest exceptions

Introduction

8.1 In this section we set out our position on the provision of internet access services on transport, including aeroplanes, trains, buses and coaches. We also include our approach to internet access services provided in public spaces such as cafes and restaurants. Finally, we discuss our position in relation to instances where there are public interest considerations.

8.2 In summary:

- We consider that in most cases internet access services provided on transport are likely to be in scope of the rules. However, we recognise there may be difficulties with applying the traffic management rules strictly where the nature of the service means that there are constraints on the available capacity. Our view is that we are unlikely to be concerned where traffic management is used in these cases to provide a reasonable service to as many users as possible and ISPs are providing sufficient transparency of the use of traffic management on their service.
- We also consider that in most cases internet access services provided in public spaces such as cafes and restaurants are likely to be in scope of the rules. As for internet access services provided on transport, our view is we are unlikely to be concerned where traffic management is used in these cases to provide a reasonable service to as many users as possible and ISPs are providing sufficient transparency of the use of traffic management on their service.
- In relation to public interest considerations, we are unlikely to be concerned where ISPs use appropriate measures to restrict or block access to certain content in order to provide parental controls or to block access to scam websites and other harmful content such as intimate image abuse. We are also unlikely to be concerned where ISPs allow access to information for vulnerable customers when the internet access service is otherwise blocked. Where ISPs zero-rate and prioritise access to emergency communications, this is likely to be in line with their obligations under the general conditions and so would be allowed within the net neutrality rules.

8.3 It is important that ISPs provide consumers with sufficient transparency about these offers. It is also important that we have sufficient information and data that allows us to monitor these offers. We also set out how ISPs should meet their obligations to provide sufficient information to consumers and clarify our approach to monitoring.

8.4 Our new guidance setting out our updated approach is in Annex 1.

8.5 This section is structured as follows:

- we first outline the regulatory framework on the scope of the net neutrality rules;
- we then outline our proposals in the 2022 Consultation, summarise stakeholder responses and provide our analysis (including our response to stakeholder comments) and our decisions for each of:

- i) internet access services provided on public transport;
- ii) internet access services provided in public spaces; and
- iii) public interest exceptions.

Scope of the net neutrality rules

- 8.6 The net neutrality rules apply to all providers of internet access services. Article 2 of the Regulation defines ‘internet access service’ as 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.
- 8.7 Sometimes, for reasons outside the control of ISPs, certain end-points of the internet may not always be accessible but this does not necessarily mean the service is not an internet access service. However, ISPs themselves should not restrict connectivity to any accessible end-points of the internet.
- 8.8 The Regulation does not, for the most part, 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.
- 8.9 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 customers), without exception.
- 8.10 In interpreting the current rules, as is the case in all areas where we exercise enforcement functions, we decide where best to focus our resources by applying our administrative priorities when considering which cases to take forward and what actions to take, taking into account benefits, risks of harm and strategic significance of taking enforcement action.
- 8.11 In the rest of this section, we explain our view on whether services provided on various forms of transport or in public spaces are publicly available internet access services and discuss the use of traffic management in these cases. We then discuss certain circumstances where traffic management may be used where there is public benefit.

Internet access services on transport

Our 2022 Consultation

- 8.12 In the 2022 Consultation, we said that consumers want to be able to access the internet wherever they go and whenever they need it, including when travelling on public transport such as aeroplanes, trains, buses and coaches. We noted that the net neutrality rules apply to all internet access services made available to members of the general public and would therefore apply to such services provided on public transport.
- 8.13 We recognised that internet access services provided on public transport are currently subject to capacity constraints that are often outside of the ISP's control. Such constraints mean ISPs on public transport have to take steps to manage internet traffic on an ongoing basis.

- 8.14 Given that the scope of the net neutrality rules is defined in the Regulation, we do not have the power to exempt or exclude any particular category of transport services from the rules. However, we considered that there were clear benefits from enabling more consumers to access the internet on public transport and that an inflexible approach to assessing how traffic management is used may have the unintended consequence of reducing consumers' ability to do so. We therefore considered that in the current circumstances we would be unlikely to prioritise enforcement action of the net neutrality rules concerning traffic management on Wi-Fi services provided on public transport.

Stakeholder responses

- 8.15 We received sixteen responses to the 2022 Consultation about the provision of internet access services on transport.
- 8.16 BT Group, Vodafone, Virgin Media O2, the Communications Consumer Panel (CCP), and the DCF supported our proposals.²⁷⁵ Inmarsat and the Internet Society supported our proposals, but indicated their preference was for internet access services provided on transport services to be exempted from the net neutrality rules.²⁷⁶ Similarly, [X] asked for changes to legislation to reflect the case for when the lack of a business case holds back ISPs' progress on delivering good quality of experience over internet access services.²⁷⁷
- 8.17 [X] suggested that Ofcom would need to impose limits on the traffic management measures that transport ISPs are permitted to impose. [X].²⁷⁸
- 8.18 Amazon supported our approach but emphasised that it should not be seen as a substitute for innovation and efforts to improve services on transport.²⁷⁹
- 8.19 The ORG noted that filters applied to internet access on trains and in other public places can block material incorrectly or inadvertently. It considered that greater transparency, review and a right of appeal are required.²⁸⁰
- 8.20 Disruptive Analysis noted that some on-train Wi-Fi systems block certain forms of content such as video or other applications such as VPNs, that are used by business travellers. They suggested that in view of the Government's policy of encouraging use of public transport services, rail ISPs should not be permitted to block these types of traffic as these are used by business travellers.²⁸¹
- 8.21 The FCS suggested that Ofcom's approach needs to be flexible enough to cater for different scenarios and challenges of each type of transport (trains, buses/coaches, planes) so that all passengers have an equal opportunity to gain reasonable access.²⁸²

²⁷⁵ [BT Group response](#) to the 2022 Consultation, p. 21; [Vodafone response](#) to the 2022 Consultation, p. 13; [Virgin Media O2 response](#) to the 2022 Consultation, p. 23; [The CCP response](#) to the 2022 Consultation, pp. 3-4. [The DCF response](#) to the 2022 Consultation, p. 5.

²⁷⁶ [Inmarsat response](#) to the 2022 Consultation, pp. 2-3; [The Internet Society](#) response to the 2022 Consultation, pp. 2-3.

²⁷⁷ [X] response to the 2022 Consultation, para 9.51.

²⁷⁸ [X] response to the 2022 Consultation, p. 7.

²⁷⁹ [Amazon response](#) to the 2022 Consultation, p. 14.

²⁸⁰ [Open Rights Group](#) response to the 2022 Consultation, p. 5.

²⁸¹ [Disruptive Analysis](#) response to the 2022 Consultation, pp. 6-7.

²⁸² [The FCS response](#) to the 2022 Consultation, p. 5.

8.22 Professor Stephen Temple argued that a more permissive approach to traffic management would not be sufficient to address the underlying problem which is a lack of adequate mobile coverage and capacity. He argued that given the scale of the investment required to increase capacity to match consumer demand, ISPs should be permitted to charge content providers a fair and reasonable carriage fee.²⁸³

Other issues raised in response to our 2022 Consultation

8.23 In addition to comments about the application of the rules to services provided on transport and the use of traffic management, we received several other comments.

8.24 The BBC indicated that a lack of adequate guidance about caching and zero-rating on transport internet access could result in unfair discrimination between content providers. It suggested Ofcom may wish to consider applying the general zero-rating principles to transport.²⁸⁴

8.25 techUK indicated that its members would like guidance on how to provide connectivity to vehicles, especially regarding the need for optimised traffic flows to autonomous vehicles.²⁸⁵

Our analysis and conclusions

8.26 Our starting point remains 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, or the public locations from which access to the internet is sought. The scope of the net neutrality rules is defined by the Regulation, and we do not have the power to exempt or exclude any particular category of services from the application of those rules as suggested by some stakeholders.

8.27 We recognise the benefits of consumers being able to access the internet over Wi-Fi on various modes of public transport and are conscious that in some contexts these are offered at no extra charge to users. These services may be subject to capacity constraints that are often outside of the ISP's control. As set out in our 2022 Consultation, these may include:

- **Aeroplanes:** internet access, while in the air, relies on satellite technology to provide backhaul connectivity from end users to the internet. 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 capacity constrained.
- **Trains:** Wi-Fi-based internet services provided on trains rely on connectivity provided by 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.
- **Buses and coaches:** connectivity for Wi-Fi services provided on buses and trains 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.

8.28 While we acknowledge that some of these capacity constraints are, in principle, capable of being addressed, we consider it unlikely that these will be resolved in the short term given

²⁸³ [Prof Stephen Temple response](#) to the 2022 Consultation, pp. 3-4.

²⁸⁴ [The BBC response](#) to the 2022 Consultation, p. 15.

²⁸⁵ [techUK response](#) to the 2022 Consultation, p. 13.

the increase in capacity of satellite networks and mobile networks across the UK that would be necessary (including in rural areas and areas where coverage may be difficult, such as in railway cuttings and tunnels).

- 8.29 Given these constraints, without some form of traffic management, there might be material consumer detriment arising from a minority of passengers using up most of the available bandwidth. This could mean many passengers not being able to use viable internet services. While providers could include policies implementing download and bandwidth limits on the heaviest use within their terms and conditions this is only likely to address the most extreme cases. We also recognise that if those providing these services are unable to manage them effectively, they could decide to stop providing these services at all. In both cases, consumers would lose out through reduced choice, and there may be negative implications for both innovation and network build.
- 8.30 In considering the impact of using traffic management on these services, we also recognise that any harm that arises from the use of traffic management is likely to affect only a subset of the passengers on board (i.e. those with heavier usage), and only for a limited period of time (for example, for the length of the journey).
- 8.31 Taking these factors into account, we are unlikely to have concerns about the use of traffic management on Wi-Fi services provided on board public transport such as aeroplanes, trains, buses and coaches in relation to the current net neutrality rules, where this is used to provide a reasonable service to as many users as possible. One approach may be to limit excessive use by some users to allow a greater number of users to be able to access the service. However, there may be other mechanisms that are more effective in specific circumstances and so we do not think that restricting ISPs to only taking a specified action is the most effective approach.²⁸⁶
- 8.32 In considering whether traffic management is being used appropriately in these circumstances, we will be likely to take into account the extent of constraints on capacity leading to the use of traffic management, and how it is applied, including whether it unfairly targets specific applications or types of traffic (such as business services, as highlighted by Disruptive Analysis). Where traffic is being blocked, we would expect that issues relating to incorrect or inadvertent blocking of content (as flagged by the ORG) can be raised by passengers through the ISP's customer services. We would expect providers to be able to explain why certain traffic is blocked and take action if this is inadvertent or in error. We note that, for example, ISPs may block content in line with the Friendly Wi-Fi initiative supported by the UK Government.²⁸⁷
- 8.33 In addition, whatever approach ISPs do take, they must comply with Article 4 of the Regulation which sets out (amongst other things) the requirement to ensure transparency of traffic management practices applied by ISPs.
- 8.34 In response to Professor Temple's argument that traffic management would not be sufficient and that charging should be allowed to improve mobile coverage, we set out our views on the case for ISPs charging content providers in Section 11.
- 8.35 Regarding Amazon's argument about traffic management potentially being a substitute for innovation and efforts to improve internet access services on transport services, this is one

²⁸⁶ One stakeholder suggested specific approaches that could be taken.

²⁸⁷ [What is the 'Friendly WiFi' Scheme? - UK Safer Internet Centre](#) [accessed 1 September 2023].

factor we would take into account in considering whether we have concerns. We also recognise the on-going effort by the telecoms and transport sectors to improve internet availability for passengers travelling on public transport which may mean the need for traffic management changes over time. We intend to continue monitoring this effort and will review our approach if appropriate.

- 8.36 We consider that allowing scope for legal exceptions to the net neutrality rules, for example in cases where there are significant network capacity constraints, such as in relation to certain types of transport, would be beneficial. However, this would require changes to the legislation which would be a matter for Government and Parliament.

Other issues raised by responses to our 2022 Consultation

- 8.37 With regard to the BBC's concerns about zero-rating, we have set out our decision to adopt new guidance concerning zero-rating offers under the net neutrality rules. This applies to all internet access services including those provided on public transport and is designed to provide clarity about the types of zero-rating offers which might be of concern because they are discriminatory in effect. In relation to the BBC's point about caching, to the extent that ISPs are caching content in their networks, we would expect this not to be undertaken in a way that discriminates between providers of similar types of content.²⁸⁸
- 8.38 We consider techUK's point in relation to the need for optimised traffic flows to autonomous vehicles relates more to specialised services (which we discuss in Section 10), rather than a question regarding the general use of public Wi-Fi type services on transport.

Internet access services provided in public spaces

- 8.39 We did not include proposals in relation to our approach to public spaces such as cafes and restaurants in our 2022 Consultation. However, we did indicate that the BEREC guidelines were relevant where a specific issue was not included in our guidance, and that stakeholders should take note of the BEREC guidelines in such cases. The BEREC guidelines suggest that, on a case-by-case review, internet access service provided in public spaces such as cafes and restaurants may be publicly available, but that national practices should be taken into account in such an assessment. In our view, these services may be publicly available, given members of the general public can access these areas and make use of the services. This means the traffic management rules would apply.
- 8.40 There are clear benefits from consumers being able to access the internet over Wi-Fi in public spaces, particularly where these are offered at no extra charge to users. Unlike services on transport, capacity constraints that are outside of the ISP's control are less likely to exist. However, where services are provided free of charge to consumers, ISPs may be subject to economic constraints and the potential for services to be withdrawn where traffic management cannot be used to manage capacity may be higher. This would have a detrimental impact on all consumers seeking to use a public Wi-Fi service.

²⁸⁸ We note that content from different providers may be treated differently, for example content from one video on demand provider may be cached whilst that of another is not, where this caching is based on the popularity of the specific content. We also note that some services where caching is used on transport systems do not constitute internet access servers, such as the storage of entertainment content on servers in airline in-flight entertainment systems.

- 8.41 In considering the impact of using traffic management on these services, we recognise that any harm that arises from the use of traffic management is likely to affect only a subset of consumers, and only for a limited period of time. In addition, users will often have alternative forms of connectivity available to them, particularly using their mobile service.
- 8.42 On balance, we consider there are benefits to consumers of these services and recognise that in order to continue to provide them, providers may need to apply traffic management measures to provide all customers with fair access.
- 8.43 On this basis, we are unlikely to have concerns about the use of traffic management on Wi-Fi services provided in public spaces such as cafes and restaurants where this is used to provide a reasonable service to as many users as possible. In considering whether traffic management is being used appropriately we will be likely to take into account how it is applied, including whether it unfairly targets specific applications or types of traffic.
- 8.44 In addition, whatever approach ISPs do take, they must comply with Article 4 of the Regulation which sets out (amongst other things) the requirement to ensure transparency of traffic management practices applied by ISPs.
- 8.45 Since the BEREC guidelines came into effect, we have not had concerns about services in public spaces and have not undertaken any enforcement action. Our position above continues with the approach we have taken to date. As explained in Section 2, we have updated our guidance to include aspects of the BEREC guidelines so that our guidance is comprehensive and set out in one place. This now includes our approach to internet access provided in public spaces.

Public interest exceptions

- 8.46 In the 2022 Consultation, we considered three specific scenarios where it may be beneficial to apply an exception to the traffic management rules:
- **Emergency communications:** the prioritisation of all 999 emergency communications;
 - **Scams:** the blocking of scams and communications with intent to defraud users; and
 - **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.
- 8.47 As set out in Section 6, 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:
- i) comply with legislation, court orders or orders by public bodies;
 - ii) preserve the integrity and security of networks, services using the networks, or end user equipment; and / or
 - iii) prevent impending network congestion, which is exceptional and/or temporary.
- 8.48 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;²⁸⁹
 - complying with a court order to block access to a website containing copyright infringing material;²⁹⁰
 - applying traffic management measures to protect the security of their network against a cyber-attack; and/or
 - applying traffic management measures as described in Section 6.
- 8.49 In the 2022 Consultation, we also considered the regulatory regime set out in the Act which gives Ofcom powers to make General Conditions (GCs).²⁹¹ 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.
- 8.50 Communications providers have a legal duty to comply with any condition set under section 45 of the Act which applies to them.²⁹² As such, in the 2022 Consultation we proposed 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 considered that amendments to the GCs provide a potential route to impose obligations on providers that would constitute an exception to the traffic management rules.
- 8.51 The rest of this section considers responses we have received to our 2022 Consultation and sets out our decisions regarding public interest exceptions.

Emergency communications

Our 2022 Consultation

- 8.52 In the 2022 Consultation we said that 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. In particular, there is an expectation that contact with the emergency services should be free and prioritised, regardless of how the call is made and that people should be able to make a call to the emergency services even if they have run out of data. More traditional ways of contacting the emergency services using telephony over the fixed or mobile network have been optimised using specialised services. However, we noted that 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. We said that we considered that all emergency communications provided to meet the relevant GCs should be prioritised, and to enable this we needed to ensure communications providers can prioritise all relevant emergency traffic delivered via internet access services, where it is technically feasible.
- 8.53 In addition, we considered that zero-rating access to emergency services via internet access services is consistent with existing Ofcom requirements for voice 999 calls (i.e. GC A3) and

²⁸⁹ 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.

²⁹⁰ For example: ISP Review, October 2021, [Six Big UK ISPs Ordered to Block Five Piracy Streaming Websites](#) [accessed 17 August 2023].

²⁹¹ As set out in sections 45 to 64 of the Act.

²⁹² Section 104(1) of the Act.

that consumers must be able to contact emergency services even if they have run out of data, including via calls made over video relay.

- 8.54 We therefore proposed 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 otherwise blocked or restricted.

Stakeholder responses

- 8.55 Stakeholders were overwhelmingly supportive of our proposed approach to the prioritisation and zero-rating of emergency traffic, where technically feasible. Several stakeholders noted the clear public benefits to this approach, with one stakeholder, the Competitive Enterprise Institute (CEI), stating that granting ISPs flexibility to prioritise emergency communications is “crucial in responding to emergencies.”²⁹³
- 8.56 Stakeholders also agreed that the GCs could provide the basis for an exception to the traffic management rules in relation to the delivery of emergency communications.
- 8.57 One stakeholder [X] agreed with our approach but raised concerns about the potential technical burden for ISPs who do not currently implement any traffic prioritisation.²⁹⁴

Our analysis and conclusions

- 8.58 We have decided that the 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 otherwise blocked or restricted.
- 8.59 Applying the obligation to treat all traffic equally to emergency communications could undermine ISPs efforts to comply with the relevant GCs. Furthermore, consumers in need of emergency services do not choose between competing commercial providers and so zero-rating such services would not reduce the incentives of any content providers to enter the market or the development of new emergency services – and therefore the role of the open internet as an engine of innovation is not undermined.
- 8.60 We consider that where ISPs are required to prioritise and ensure continuous access to these services under the GCs, this requirement constitutes a legal obligation within the meaning of Article 3(3)(a) and therefore an exception to the traffic management rules applies.
- 8.61 Ofcom is responsible for ensuring that communications providers fulfil their obligations to customers by enabling timely and reliable access to emergency services. In 2021 we published a statement on emergency video relay and outlined changes to the GCs to enable the introduction of emergency video relay services.²⁹⁵ Emergency video relay services enable people who use British Sign Language (BSL) to call for help and to receive advice in emergency situations in their first language, to ensure disabled people have equivalent access to emergency communications.
- 8.62 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. GC C5.12d states that “[i]n providing access to and facilitating use of Emergency Video Relay Services under Condition C5.11, Regulated Providers must: (d) subject to Condition C3.11,

²⁹³ [The Competitive Enterprise Institute \(CEI\) response](#) to the 2022 Consultation, p. 13.

²⁹⁴ [X] response to the 2022 Consultation, p. 4.

²⁹⁵ Ofcom, 2021. [Statement: Emergency video relay](#).

ensure that the Emergency Video Relay Service is available for lawful use by End-Users at all times”.

- 8.63 Therefore, GC C5.12d requires providers to ensure that emergency communications that rely on internet access can be used continuously.
- 8.64 As such, where an ISP needs to prioritise or zero-rate communications with the emergency services, and where it needs to allow access to continue when general data allowance is exhausted, to meet the conditions imposed on regulated providers by GC C5.12d, this would not be a breach of the net neutrality rules.
- 8.65 We accept that there are technical challenges to identifying and categorising specific traffic, including video traffic, and that these technical limitations could have an effect on an ISP’s ability to prioritise and zero-rate emergency calling in the short to medium term. However, there is significant public benefit to ensuring consumers have uninterrupted access to emergency services and our expectation is that ISPs should be able to overcome any potential technical challenges in most cases.
- 8.66 We have updated our guidance to reflect this approach (see Annex 1).

Scams

Our 2022 Consultation

- 8.67 In our 2022 Consultation, we considered the appropriateness of blocking access to scam content, while preserving access to the widest possible information on the internet. As part of this, we considered how to ensure that content is not inappropriately blocked, and that consumers can continue to access the content and websites they want to see, while balancing the need to protect people in the face of increasingly complex fraudulent criminal activity.
- 8.68 We did not believe that the net neutrality rules should be a barrier to better consumer protection against scams. While our scams work would continue to consider policy recommendations in this area, we proposed that we would not have concerns in relation to the net neutrality rules where ISPs block access to scams or fraudulent content, provided that this was undertaken by providers on a reasonable, proportionate, targeted and appropriately evidenced basis.

Stakeholder responses

- 8.69 Most stakeholders recognised the potential benefits of blocking scams and fraudulent content, but several respondents (Amazon, Google and [S&C]) raised concerns about the over blocking of legitimate content and the need for a dispute resolution mechanism when a content provider or business feels their content has been blocked in error.²⁹⁶

Our analysis and conclusions

- 8.70 Online scams and fraud continue to be a major consumer protection problem; our research has found that nearly nine in ten (87%) adult internet users have encountered content online that they believe to be a scam or fraud.²⁹⁷
- 8.71 Scammers use a range of channels, including social media and search services, so it is important for Ofcom and other enforcement agencies to take a holistic, joined-up approach

²⁹⁶ [Amazon response](#), p. 15; [Google response](#), p. 20; [S&C] response, p. 4.

²⁹⁷ Ofcom, 2023. [Online scams and fraud report](#).

that takes account of the many and varied ways people can be exposed to scams. Ahead of receiving new powers as the UK's online safety regulator, we have also been looking in detail at online users' experiences of online fraud and we published our first set of findings in March 2023.²⁹⁸

- 8.72 The Online Safety Bill (the Bill), which is expected to become law shortly, will place specific duties on providers of online user-to-user and search services to keep people safe online by making sure that these providers have systems and processes in place to mitigate and manage the risks that fraud (among other things), including fraudulent advertisements, poses to their users.²⁹⁹
- 8.73 The blocking of content by ISPs is prohibited by the net neutrality rules unless it falls under a specific exception. If other legislation imposes duties on ISPs to block access to scams or fraudulent content, then an exception to the traffic management rules under Article 3(3)(a) of the Regulation will apply. However, ISPs are likely to be out of scope of the Bill unless they are providers of one of the relevant services (i.e. online user-to-user and search services and providers of paid for adverts).
- 8.74 We consider that there is a clear public benefit to ISPs blocking content to protect consumers from online scams and fraud. However, we need to balance this against preserving access to the widest range of information on the internet.
- 8.75 In response to comments from stakeholders, we believe the risk from over blocking to be low and therefore think it would be a disproportionate approach to require the implementation of formal dispute resolution mechanisms, provided ISPs block access on a reasonable, proportionate, targeted and appropriately evidenced basis. However, ISPs should provide information to content providers and businesses on how to report content they believe has been inappropriately blocked, and take appropriate action if this is shown to be the case.
- 8.76 Blocking legitimate content could constitute a breach of the net neutrality rules. Where it appears to us that ISPs are not taking appropriate action to avoid the ongoing blocking of legitimate content, we may consider taking enforcement action.
- 8.77 We have therefore decided that, in relation to the net neutrality rules, where ISPs block access to scams or fraudulent content, Ofcom is unlikely to have concerns – if this is undertaken by providers on a reasonable, proportionate, targeted and appropriately evidenced basis.

Parental controls and other content filters

Our 2022 Consultation

- 8.78 In our 2022 Consultation, we noted the value that domestic and business users place on being able to use in-network filters and parental controls, and the importance of customers actively consenting to the filtering of their content, particularly in relation to parental controls.

²⁹⁸ Ofcom, 2023. [Online scams and fraud report](#).

²⁹⁹ The duties we have referred to in this section are not yet in force but will include: (a) taking proportionate steps to prevent users encountering illegal content on user-to-user services; and (b) taking proportionate steps to minimise the risk of users encountering illegal content via search results on search services. In this context illegal content includes fraudulent content.

8.79 The use of in-network content filters is subject to the net neutrality rule that ISPs should not block content in the network unless one of the exceptions in sub-paragraphs (a) to (c) applies. Given the benefits from these controls and the Government’s support of internet content filters in the Digital Economy Act, we set out that Ofcom is unlikely to have concerns about the use of these controls where these are appropriately used. However, we suggested that clarifying the use of these controls in the legislative framework could be beneficial, noting that any changes to legislation would be a matter for Government and Parliament.³⁰⁰

Stakeholder responses

8.80 Stakeholders were broadly supportive of our proposals, with the Competitive Economics Institute stating that our policy “could enhance consumer welfare as ISPs compete to deliver services with superior content filters and parental controls.”³⁰¹

8.81 However, some concerns were raised around the accuracy and transparency of content filters. The Open Rights Group stated that some legitimate UK businesses, often SMEs, have been arbitrarily blocked by filters causing an unexplained loss of traffic and loss of business.³⁰² The stakeholder cited, as an example, corner shops and pubs being caught by filters due to the presence of alcohol.

8.82 The Internet Society called for regulation that clearly distinguishes between the blocking and filtering that happens in-network versus over-the-top.³⁰³ They argued that ISPs should be limited in what they block because they are not always best suited to block attacks on services delivered over the network or on users’ devices through email abuse, spam, phishing and malware.

Our analysis and conclusions

8.83 Although the use of in-network content filters is subject to the net neutrality rules, so that ISPs should not block content unless one of the exceptions in sub-paragraphs (a) to (c) applies, we continue to recognise the value that these content filters provide to domestic and business users.

8.84 In relation to concerns about inappropriate blocking, including the blocking of some legitimate businesses and individuals, ISPs should provide sufficient transparency of what is and is not blocked by their filters so that residential and business consumers and content providers can make informed decisions about the filters. This is important as we expect end users, not the ISPs themselves, to decide whether filters should be used or not.

8.85 As outlined above in the section on scams, ISPs should have processes in place that allow consumers, businesses, and content providers to report content that is being inappropriately blocked. Where ISPs continue to inappropriately block content, this could constitute a breach of the net neutrality rules. Where it appears to us that ISPs are not taking

³⁰⁰ In 2017 UK Government introduced a provision of domestic law (see [section 104](#) of the Digital Economy Act 2017) 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”. While Government support for the use of internet content filters is clear, we consider that 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) is not met. On this basis, there is a degree of legal uncertainty on the continued use of in-network parental content filters.

³⁰¹ [Competitive Enterprise Institute \(CEI\) response](#) to the 2022 Consultation, p. 13.

³⁰² [Open Rights Group \(ORG\) response](#) to the 2022 Consultation, response to question 16, pp. 5 – 6.

³⁰³ [The Internet Society response](#) to the 2022 Consultation, p. 5.

appropriate action to avoid the ongoing blocking of legitimate content, we may consider taking enforcement action.

- 8.86 With regards to the point raised about the need for regulation that distinguishes between in-network and over-the-top controls, over-the-top controls – which are installed as applications on handsets or software in routers – do not sit within an ISP’s network and are therefore out of the scope of net neutrality rules. However, we accept the broader point that the blocking or filtering of content may be more appropriate when it is done at different points in the network (such as the application) rather than in the network. Our approach allows end users – and not the ISP – to choose to use over-the-top or in-network filters.
- 8.87 Given the benefits these controls provide to both domestic and business consumers, we have decided that, in relation to the net neutrality rules, the appropriate and reasonable use of parental controls and other content filters is unlikely to be a concern for Ofcom. Clarifying the use of these controls in the legislative framework would be beneficial. However, any changes to the legislation would be a matter for Government and Parliament.

Other issues

- 8.88 This section sets out two additional issues that were raised in response to the 2022 Consultation.

Vulnerable consumer information

- 8.89 Ofcom’s vulnerability guidance highlights the serious harm that service disruption, for example for non-payment, can have on vulnerable consumers and calls on providers to protect, where possible, “calls to free helplines dedicated to e.g. protecting children and domestic abuse victims, even during service restrictions, and making customers under service restrictions aware of this approach”.³⁰⁴ The guidance also encourages providers to “include information in payment and collection related communications about where customers can access free debt advice”.³⁰⁵ ISPs may choose, for example, to include phone numbers but also web pages.
- 8.90 It is vital that vulnerable consumers can access important information when their service is restricted, for example where they are struggling to pay their bills (as explained in our vulnerability guidance). Similar to our approach in relation to the blocking of scams and parental controls, where an ISP allows vulnerable consumers to access these websites when their service has been restricted, although the net neutrality rules apply, this is unlikely to be a concern for Ofcom.³⁰⁶

Intimate image abuse

- 8.91 The Revenge Porn Helpline (RPH) / South West Grid for Learning (SWGfL) agreed that ISPs should be allowed to block scams and fraudulent content and suggested that other illegal content should also be considered for blocking. In particular, RPH raised the lasting impact that intimate image abuse (IIA) can have on victims and survivors, especially as this illegal

³⁰⁴ Ofcom, 2020. [Treating vulnerable customers fairly guide](#), para. 4.55

³⁰⁵ Ofcom, 2020. [Treating vulnerable customers fairly guide](#), para. 4.56

³⁰⁶ We would expect this access to be free, and note that we would be unlikely to be concerned about this in relation to our approach to zero-rating in Section 5.

content is often continuously reshared.³⁰⁷ As a result, RPH believe that IIA should be considered under the General Conditions.³⁰⁸

- 8.92 The Online Safety Bill (the Bill), will designate two intimate image abuse offenses (one in Scottish law, and one in English and Welsh law) as priority offences.³⁰⁹ This means that there will be a legal duty on online user-to-user services to take down content if there is reasonable grounds to infer that it amounts to an offense of intimate image abuse under either English and Welsh, or Scottish law. Search services will have a legal duty to operate in a way that minimises the risk of individuals encountering such illegal content.
- 8.93 If ISPs block access to such images, although the net neutrality rules will apply unless there is an exception under Article 3(3)(a), we are unlikely to have concerns where this is done appropriately. In assessing action taken by ISPs we would take into account the approach they have taken to identifying such images.

³⁰⁷ Intimate image abuse relates to the non-consensual disclosure of, or threats to disclose, intimate images.

³⁰⁸ [South West Grid for Learning \(SWGfL\) response to the 2022 Consultation](#), p. 3.

³⁰⁹ The specific priority offences are Section 2 of the Abusive Behaviour and Sexual Harm (Scotland) Act 2016 and for England and Wales this is likely to be Section 66B of the Sexual Offences Act 2003 once the OSB receives Royal Assent.

9. Terminal equipment

Introduction

- 9.1 The current net neutrality rules allow users of internet access services to use the terminal equipment of their choice.³¹⁰ In this section we set out our analysis of the impact of these rules on ISPs' ability to effectively manage their networks and our conclusions on the approaches ISPs can take to address scenarios where a small number of very heavy users may cause congestion, impacting the services of other users.
- 9.2 In summary, we have decided that, while ISPs cannot restrict customers' ability to use or tether devices³¹¹, they can directly address the potential issue of excessive data use in periods of congestion under the existing net neutrality rules through traffic management. This approach is more consistent with our objectives – particularly relating to innovation and end-user rights. Further, we have clarified that ISPs may have fair usage policies to disincentivise excessive data use, subject to this being appropriate to the internet access service provided and being transparent to consumers.
- 9.3 We also consider that under the current rules, ISPs have flexibility to offer innovative and differentiated services that cater to the needs of different devices.
- 9.4 This section also provides clarifications on terminal equipment rules related to specialised services, technical requirements related to specific internet access services, and eSIMs.
- 9.5 We set out our guidance in Annex 1.

Background

The Regulation

- 9.6 The treatment of terminal equipment is specified under the net neutrality rules.
- 9.7 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.

Market context

- 9.8 Consumers access the internet using a range of devices including mobile phones, tablets, desktop and laptop 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

³¹⁰ In the context of net neutrality rules, '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.

³¹¹ That is, using a mobile device to create and host a temporary Wi-Fi network (sometimes also called a hotspot).

internet. Connectivity will become increasingly ubiquitous for home appliances, vehicles and business/industrial devices.

- 9.9 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.

Our 2022 Consultation

- 9.10 In our 2022 Consultation, we considered concerns that the terminal equipment rules limit ISPs' ability to manage their networks by stopping ISPs from limiting usage to particular device types to prevent large or unlimited data allowances being used in unintended ways. We also considered concerns that the rules limit service innovation because they prevent ISPs from offering services customised for, and restricted to, particular devices or device types.
- 9.11 In relation to excessive data use, the main concerns were related to the use of tethering and the use of mobile SIMs in routers. Such usage may generate much larger volumes of traffic than are normally associated with mobile handsets, potentially leading to localised network congestion and service degradation for other customers.³¹²
- 9.12 We observed that the net neutrality rules prohibit restrictions on the devices which are used to access the internet. To manage the excessive usage, we said ISPs could, for example, set data allowances and/or fair usage policies to manage the use of mobile packages with devices that would generate much higher traffic volumes, such as fixed devices or large numbers of tethered devices.
- 9.13 We also considered that ISPs have significant flexibility to specify commercial and technical characteristics of internet access services (such as price, bandwidth, data allowance, quality and fair usage policies), without restricting device types. We therefore considered that they should 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.
- 9.14 We also set out that restricting terminal equipment would require a change in the net neutrality rules. While we acknowledged that terminal equipment restrictions could give ISPs greater flexibility to manage data usage on their networks, we considered that the benefit would likely be small and would need to be weighed against the erosion of consumers' freedom to use the terminal equipment of their choice, as well as the risk that restrictions could limit innovation of devices and content. We noted that any change to allow scope for ISPs to restrict the use of terminal equipment would be a matter for Government and Parliament.

Stakeholder responses

- 9.15 In response to our 2022 Consultation, some stakeholders including mobile ISPs restated their arguments regarding the need for terminal equipment restrictions to help manage

³¹² Based on our discussions with ISPs prior to the consultation. See paragraph 9.16 of the [2022 Consultation](#).

excessive usage and to allow further flexibility in designing services catering for specific device types. We discuss these arguments below.

- 9.16 Content providers (the BBC, Meta, Netflix, Sky, Amazon) and other representative bodies and industry analysts (the CCP, FCS, Open Rights Group, Disruptive Analysis) supported our position and the terminal equipment provisions under the net neutrality rules.³¹³

Managing excessive usage

- 9.17 Mobile ISPs, in general, disagreed with our position and reiterated that under the current terminal equipment rules, a small number of customers generate excessive data use, which does not lead to good outcomes for consumers as a whole. In particular, mobile ISPs (specifically BT Group, Vodafone, and Virgin Media O2) said that terminal equipment rules prevent them imposing restrictions on the number and type of connected devices used with a SIM. They argued that this negatively impacts most consumers as extreme data usage by individuals can cause congestion in the network and lead to higher prices of unlimited data packages. These mobile ISPs and one other stakeholder [X] did not believe that they have adequate flexibility to address excessive usage and wanted us to seek legislative change from Government to relax the prohibition on tethering, or at least deprioritise enforcement.³¹⁴
- 9.18 Utility Warehouse, an MVNO, was also concerned about the inability to impose device and tethering restrictions. It argued that [X].³¹⁵
- 9.19 BT Group disagreed with our suggestion in the 2022 Consultation that ISPs could set data allowance and/or fair usage policies to deter excessive usage, noting that customers value unlimited data allowances, and restricting usage would effectively not be offering an unlimited tariff. Utility Warehouse sought clarifications on the permissible restrictions in fair usage policies.³¹⁶ [X].³¹⁷
- 9.20 As already set out in Section 6, Vodafone also argued that mobile networks need to be able to effectively manage very heavy users that use the network on a high intensity basis (at levels well in excess of what could reasonably be considered normal personal use) and cause network congestion. It considered that ISPs need the freedom to apply fair usage policies to help manage this risk.³¹⁸

Lack of flexibility to cater for different types of device

- 9.21 Mobile ISPs and some other stakeholders said that the terminal equipment rules prevent them from tailoring internet access services to specific devices. The Competitive Enterprise

³¹³ [Amazon response](#) to the 2022 Consultation, p. 14; [The BBC response](#) to the 2022 Consultation, pp. 14-15; [Meta response](#) to the 2022 Consultation, p. 18; [Netflix response](#) to the 2022 Consultation, p. 1; [Sky response](#) to the 2022 Consultation, p. 3; [The CCP response](#) to the 2022 Consultation, p. 4; [The FCS response](#) to the 2022 Consultation, p. 5; [Open Rights Group response](#) to the 2022 Consultation, p. 5; [Disruptive Analysis response](#) to the 2022 Consultation, p. 6.

³¹⁴ [BT Group response](#) to the 2022 Consultation, pp. 11-12; [Vodafone response](#) to the 2022 Consultation, pp. 12-13; [Virgin Media O2 response](#) to the 2022 Consultation, pp. 23-24; [X] response to the 2022 Consultation, para 49.

³¹⁵ [Utility Warehouse response](#) to the 2022 Consultation, p. 3.

³¹⁶ [BT Group response](#) to the 2022 Consultation, pp. 11-12.

³¹⁷ [X]

³¹⁸ [Vodafone response](#) to the 2022 Consultation, p. 8.

Institute argued that IoT and 5G enabled devices require ISPs to prioritise specific traffic categories, and Ofcom should adopt an approach that allows ISPs to prioritise traffic flows depending on the types of terminal equipment. Vodafone argued that the rules are outdated given the ever-growing range of connected devices, which have very different purposes and connectivity needs. Vodafone said ISPs should be able to tailor products that suit different types of terminal equipment as this is efficient for the network and fair to consumers.³¹⁹ BT Group said [X].³²⁰

Other issues

9.22 Utility Warehouse sought clarification on whether embedded SIMs are compatible with the net neutrality rules on terminal equipment.³²¹

Our analysis and conclusions

9.23 In the remainder of this section, we set out our analysis in response to stakeholder comments and our decisions, namely:

- the benefits of the terminal equipment rules;
- our analysis of data consumption by mobile customers; and
- our decisions and clarifications on:
 - > the measures ISPs have within the current rules to manage excessive data use;
 - > the flexibility ISPs have within the current rules to tailor services for specific devices; and
 - > some additional points for clarification.

Benefits of terminal equipment rules

9.24 Customers of internet access services, under the current rules, have the freedom to choose devices that best suit their needs, independently of their ISP. This provides flexibility to customers as they, for example, may choose to use a different device when their requirements change or if a new device provides features that they prefer. This in turn encourages innovation as device suppliers seek to cater to the needs and preferences of customers, which can change over time. Without the rules, suppliers of devices may be deterred from innovation if they are concerned that certain device types may be disallowed or disadvantaged by ISPs.

9.25 Therefore, we consider that the current net neutrality rules on terminal equipment provide significant benefits to customers and encourage innovation in devices.

Data consumption by mobile customers

9.26 In their responses to our 2022 Consultation and during meetings with us, mobile ISPs argued that a small number of mobile customers with unlimited data allowance generate

³¹⁹ [The Competitive Enterprise Institute response](#) to the consultation, p. 12; [Vodafone response](#) to the 2022 Consultation, pp. 12-13.

³²⁰ [BT Group response](#) to the 2022 Consultation, para 34.

³²¹ [Utility Warehouse response](#) to the 2022 Consultation, p. 3.

exceptionally large amounts of data usage, and instances of this can be more likely in circumstances where consumers use tethering or fixed wireless routers.

9.27 We have gathered further information from mobile ISPs to understand the nature of the data usage patterns by mobile customers.

9.28 In summary, this data indicates that:³²²

- A very small minority of mobile customers account for a large share of total data usage on mobile networks. The top 1% of mobile customers consume around [X] of data used by mobile customers on ISPs' networks, and the top 10% of mobile customers consume [X] of all data used by mobile customers.
- The vast majority of mobile customers, including those on unlimited packages, use less data than the maximum data allowed in ISPs' most generous limited packages.
- Users of routers account for a small proportion of overall data traffic. The average usage of those identified as using routers is also lower than the average usage of the top 1% of customers. In addition, users of routers account for a small proportion of the top 1% of customers on the network.
- ISPs were not able to provide data on the use of tethering.

9.29 On this basis we conclude that most of the highest users of data are not using SIMs in fixed wireless routers and therefore restricting the use of routers is unlikely to be the most effective approach to address issues with high usage.

Managing excessive data use

9.30 As set out in paragraph 9.7, the current net neutrality rules prohibit restrictions on the devices which are used to access the internet.

9.31 Taking into account our analysis above, and the benefits we consider arise from the current terminal equipment rules, we do not agree with mobile ISPs that we should suggest that Government consider legislative changes in relation to the rules on terminal equipment.³²³

9.32 We consider that as the potential problems for networks and consumers (e.g. congestion and service degradation) are caused by excessive data use, ISPs should address this directly within the current rules.

9.33 From the data summarised above, it is evident that a small number of customers generate exceptionally large amounts of data traffic. However, based on the data available to us, many of the mobile customers with the heaviest data usage are not using SIMs in routers.³²⁴ We therefore disagree with mobile ISP's comments that to manage their network, they need restrictions on the number and type of connected devices used with a SIM, as we do not consider that restrictions on terminal equipment usage and the consequent impact on the benefits for consumers would be the most effective way to address the concerns identified.³²⁵

9.34 Regarding BT Group's comment on mobile tariffs with unlimited data allowance, we observe that where there is a commercial imperative for ISPs to offer unlimited data tariffs, it is up to the ISPs to price their unlimited mobile services appropriately so that the supply of these

³²² The evidence on mobile customers' data consumption is set out in more detail in Annex 3.

³²³ See mobile ISPs' comments as set out in paragraph 9.17.

³²⁴ We have also not received any evidence on the usage of tethering.

³²⁵ See stakeholder comments set out in paragraph 9.17.

services is sustainable given the demand. The ability to manage network resources during congestion through traffic management and fair usage policies should also enable ISPs to manage potential excessive usage of services with unlimited data under the current net neutrality rules (see paragraphs 9.36-9.39). We therefore do not consider that device usage should be restricted in response to high demand for data by customers who purchase unlimited data services.

- 9.35 In response to Utility Warehouse who sought clarifications on the permissible restrictions under fair usage policies, we clarify below and in the guidance in Annex 1 the actions ISPs may undertake within the current net neutrality rules.

ISPs can address excessive data use under the current rules

- 9.36 We consider that ISPs can directly address the potential concerns from excessive usage under the current net neutrality rules through the use of traffic management, setting data allowances and/or fair usage policies to address high traffic volumes.
- 9.37 In relation to traffic management, as set out in Section 6, ISPs may manage the allocation of network resources between users to mitigate the impact of congestion. During periods of network congestion, ISPs may use traffic management to take such actions to ensure an equitable allocation of network resource, so that they provide a reasonable level of service to as many customers as possible. We expect that such actions should be proportionate and still allow customers a reasonable level of service, where possible.³²⁶
- 9.38 In addition, as indicated in the 2022 Consultation, ISPs may set fair usage policies. We note several respondents raised concerns about this approach and so we set out here clarifications on the use of fair usage policies consistent with the net neutrality rules.³²⁷
- 9.39 ISPs may specify contract terms such as fair usage policies that disincentivise excessive usage (i.e. data usage at a level significantly in excess of the normal range of usage for a particular internet access service).³²⁸ This may enable ISPs to take reasonable and proportionate action against those with excessive usage. However, ISPs should ensure that their fair usage policies are appropriate to the specific internet access service provided. For example, we expect that the usage thresholds that trigger restrictions under fair usage policies could differ between fixed broadband services and mobile services, as the normal range of usage of these services would differ. They must also be communicated clearly to customers when making purchasing decisions and be consistent with the transparency requirements as set out in Article 4(1) of the Regulation.
- 9.40 Fair usage policies should not specify restrictions on the number or type of devices that can be used for the internet access service at a given time. Such restrictions (including limiting the use of routers or tethering with an internet access service) are unlikely to be considered compatible with the terminal equipment rules.

³²⁶ We recognise that in some instances, congestion on the network may be severe, and the level of service that is achievable will depend on network capacity and demand at the specific time and location.

³²⁷ ISPs should also be mindful, when setting contract terms, of other relevant consumer protection laws, regulation, and guidance beyond the scope of the net neutrality rules.

³²⁸ For clarity, we consider that such restrictions would only be appropriate for customers with unlimited data allowances, as customers with limited data allowance are unlikely to generate excessive usage without incurring additional costs. ISPs may also throttle or stop services to customers who have reached their data allowance under the general terms of providing the internet access services.

Tailoring services for specific devices

9.41 We do not agree with stakeholders' comments that the terminal equipment rules prevent ISPs from innovating to specifically cater for different devices. We remain of the view that ISPs have significant flexibility under the current rules to specify commercial and technical characteristics of internet access services to incentivise customers to choose the appropriate services and to suit device requirements. Our updated guidance provides ISPs with the following flexibility:

- As set out in Section 7, ISPs may offer internet access services with different levels of quality of service (e.g. guaranteed bandwidth, latency). This allows ISPs to develop internet access services, including for supporting particular use cases that meet certain consumer needs (which may or may not be associated with a certain device type), with a suitable priority level on the network. In light of this, we consider ISPs do not need to directly restrict the terminal equipment which can use a given internet access service. We understand that [X].^{329 330}
- In addition, as set out in Section 6, ISPs have the flexibility to treat categories of traffic differently according to their technical characteristics to contribute to network efficiency and to optimise overall transmission quality. This includes applying different traffic management approaches to different retail offers (for example, where they develop specific retail offers as above).
- As set out in paragraphs 9.36-9.39, ISPs can manage the allocation of network resources during congestion and may specify fair usage policies for specific internet access service designed for certain use cases.

9.42 We therefore conclude that ISPs have sufficient flexibility under the current rules to specify commercial and technical characteristics of internet access services, without restricting device types.

Additional clarifications

9.43 The terminal equipment rules only apply to internet access services. Specialised services are not subject to the restrictions in respect of terminal equipment.

9.44 We also note that technical network requirements may mean that features of certain internet access services may only be useable with a limited range of terminal equipment or other equipment provided by ISPs. For example, we understand that Vodafone's 5G Ultra product is currently only compatible with a limited number of handsets.³³¹ We are unlikely to consider such services as violating the rules, so long as any device with the capability of delivering the service would not be excluded from using the service.

9.45 We do not consider that eSIMs are incompatible with the terminal equipment rules.³³² An eSIM is an alternative to a traditional mobile SIM card. It is permanently embedded in a device during manufacture. Unlike a traditional SIM, an eSIM cannot therefore be physically transferred to another device by an end-user. However, eSIMs support remote configuration

³²⁹ [X]

³³⁰ Specialised services provide a further alternative, in some circumstances, for supporting use-cases requiring optimisation to meet quality requirements.

³³¹ See Vodafone website: <https://www.vodafone.co.uk/network/5g> [Accessed 5 Sep 2023]. "5G Ultra is currently available on the Samsung Galaxy S21 series and Samsung Galaxy S22 series, with more coming soon."

³³² See comments from Utility Warehouse in paragraph 9.22.

processes which allow ISPs to remotely provision services and to transfer them between devices. End-users should therefore be able to transfer internet access services between devices. As usage of eSIMs increases, we anticipate that ISPs will increasingly develop self-service options to simplify transfer of services between devices.

10. Specialised services

Introduction

- 10.1 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. Specifically, ISPs can offer services other than internet access which optimise traffic to meet quality requirements for specific content, applications or services that cannot be met by general internet access services. In this section we set out our analysis and conclusions in relation to specialised services.
- 10.2 In summary, we have concluded that we should provide greater clarity and flexibility in relation to the provision of specialised services, to enable ISPs to provide specialised services more easily and use network resources more efficiently. We have set out guidance on:
- ISPs meeting requirements to demonstrate the need for optimisation, in particular that ISPs should be able to demonstrate that the specialised service is needed to meet the quality requirements of particular content, applications or services because it cannot be delivered consistently over the ISP’s internet access services.
 - ISPs ensuring there is sufficient capacity to ensure the general quality of internet access services are not adversely impacted, in particular that ISPs should take into account the likely traffic demands of specialised services in addition to their internet access services when carrying out their capacity planning processes.
 - Non-internet services that are outside the scope of the net neutrality rules, in particular services that are not publicly available.
- 10.3 It is important that ISPs provide sufficient transparency about the specialised services they provide. It is also important that we have sufficient information and data that allows us to monitor these offers. We set out how ISPs should meet their obligations to provide sufficient information and clarify our approach to monitoring.
- 10.4 Our new guidance setting out our updated approach is in Annex 1.
- 10.5 This section is structured as follows:
- we first outline the regulatory framework on specialised services;
 - we then outline our proposals relating to specialised services that were set out in our 2022 Consultation and summarise stakeholder responses; and
 - finally, we provide our analysis (including our response to stakeholder comments) and conclusions.

Background

- 10.6 The internet supports a wide range of content and applications. However, some have quality requirements which are not supported by internet access services. These tend to be innovative applications but there are also established applications with demanding quality requirements such as certain types of voice services.
- 10.7 The net neutrality rules allow for the provision of specialised services – services other than internet access services optimised for content, applications or services which have quality

requirements not supported by internet access services. The rules also impose certain conditions on the provision of specialised services designed to safeguard the open internet and to preserve it as an engine of innovation.

Service innovation and specialised services

- 10.8 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 and applications requiring an internet or network connection already vary in terms of their quality of service requirements.
- 10.9 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). As we discuss in Section 7, 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 content, applications or services that are not supported by internet access services, i.e. specialised services.
- 10.10 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).
- 10.11 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 in relation to applications and services which have quality requirements that are not supported by standard internet access services. The availability of specialised services (e.g. services to support automated industrial processes which require low latency) could in turn support innovation and productivity enhancements in the wider economy.
- 10.12 If ISPs choose to offer specialised services to meet these requirements, and where such services are publicly available, ISPs need to ensure that they are compliant with the specialised services rules.

Treatment of specialised services under the net neutrality rules

- 10.13 The rules governing the provision of specialised services are set out in Article 3(5) of the net neutrality rules. This specifies that ‘providers of electronic communications to the public’ may offer services other than internet access services which are optimised for specific content, applications or services under certain conditions, namely:
- i) optimisation is necessary in order to meet requirements of a specific level of quality;
 - ii) the services are not usable or offered as a replacement for internet access services;
 - iii) the network capacity is sufficient to provide these services in addition to any internet access service offered; and
 - iv) they are not detrimental to the availability or general quality of internet access services for end-users.

- 10.14 Examples of applications and services that might satisfy the optimisation criteria (subject to a case-by-case assessment) include:
- **Telephony services:** these require a high level of service assurance due to the critical nature of the application. They are also sensitive to variations in quality parameters such as bandwidth, latency and jitter which can impair call quality. Optimisation may therefore be necessary, particularly in mobile networks given the likelihood of quality impairments in mobile networks.
 - **Linear IPTV services** that use certain multicast technologies: these services distribute live TV services over IP networks by ‘broadcasting’ each TV channel to multiple end-users in a fixed encoding format. In contrast to video-on-demand services, there is no rate adaptation capability or ability to retransmit lost packets. Consequently, optimisation may be required to ensure their minimum quality requirements are met for reliable operation.
 - New **real-time health applications** such as remote surgery: given the critical nature of such applications, optimisation may be required to ensure reliable operation.
- 10.15 Private networks and electronic communications services which are not publicly available fall outside the scope of the net neutrality rules and so are not considered specialised services. This can include wholesale services provided to other operators including, for example, wholesale offers to mobile virtual network operators.

Our approach to specialised services to date

- 10.16 In contrast to zero-rating and traffic management, we have not previously issued any supplementary guidance about our approach to assessing specialised services.
- 10.17 As part of our monitoring programme, we asked ISPs for information about the specialised services 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 these.

Our 2022 Consultation

- 10.18 In the 2022 Consultation, we considered whether the framework for specialised services is delivering good outcomes for consumers and achieving our objectives.
- 10.19 We found that in general the specialised services framework had performed well in relation to our objective of safeguarding citizens’ and consumers’ access to the open internet.
- 10.20 However, we provisionally concluded that the net neutrality framework appeared to, or was at least perceived to, suffer from a lack of clarity and flexibility in relation to the provision of specialised services. We considered this may hinder our objectives of safeguarding the internet as an engine of innovation and safeguarding well run and efficient networks. We were concerned that ISPs might be deterred from deploying specialised services to support innovative content and applications or might provide more network capacity than is necessary to maintain the quality of their internet access services.
- 10.21 We proposed to give guidance clarifying our interpretation of the specialised services rules and apply a more flexible approach, enabling ISPs to provide specialised services more easily and use their network resources efficiently. We also clarified our approach to mitigating the

risk that greater flexibility could increase the risk of adverse outcomes for consumers, particularly in relation to the general quality of internet access.

10.22 The main points of our proposed guidance were:

- **Optimisation criteria:** our proposed guidance clarified that specialised services can provide access to content or applications which are also accessible using the ISP's internet access service, provided that they are optimised to provide additional functionality or a better quality of service than can be supported by internet access services. ISPs should be able to demonstrate a reasonable expectation of the need for optimisation, for example through service trials.
- **Network capacity and impact criteria:** our proposed guidance clarified that the impact of a specialised service would be detrimental to the availability of internet access services if it causes the quality to fall below the contractual quality standards of the internet access services or degrade significantly as measured by standard quality parameters.
- **Non-internet services outside the scope of the specialised services rules:** our proposed guidance clarified that services which are not publicly available fall outside the scope of the net neutrality rules and we set out our interpretation of publicly available services in this context.

Stakeholder responses

10.23 Twenty respondents to the 2022 Consultation commented on our proposed approach to specialised services. The main points can be categorised into three broad groups:

- Respondents who supported our proposals for specialised services: Amazon, BT Group, the Digital Connectivity Forum, Disruptive Analysis, Ericsson, Sky, techUK and another respondent [redacted].³³³ These respondents generally considered that our proposed guidance would reduce barriers to the provision of specialised services by clarifying the rules and providing additional flexibility. Some also sought changes to our draft guidance to provide greater clarity and flexibility.
- Respondents who were concerned about our proposals for specialised services or opposed them: Akamai, Google, Meta, the BBC and another respondent [redacted].³³⁴ Although some welcomed the additional clarity provided by our draft guidance, these respondents were concerned that greater flexibility to provide specialised services could pose a risk to the open internet – weakening ISPs' incentives to improve internet access services and increasing the likelihood that specialised services would be required for some types of traffic.
- Respondents who were broadly supportive of our proposals but considered that more extensive reform of the net neutrality framework is required to address their concerns about the barriers to innovation: Competitive Enterprise Institute, ISPA,

³³³ [Amazon response](#) to the 2022 Consultation, pp. 12-13; [BT Group response](#) to the 2022 Consultation, pp. 5-6; [The Digital Connectivity Forum response](#) to the 2022 Consultation, p. 5; [Disruptive Analysis response](#) to the 2022 Consultation, pp. 5-6; [Ericsson response](#) to the 2022 Consultation, p. 3; [Sky response](#) to the 2022 Consultation, pp. 2- 3; [techUK response](#) to the 2022 Consultation, pp. 10- 11; [redacted] response to the 2022 Consultation, pp. 4- 6.

³³⁴ [Akamai response](#) to the 2022 Consultation, p. 12; [Google response](#) to the 2022 Consultation, pp. 17- 19; [Meta response](#) to the 2022 Consultation, pp. 2- 3, 12- 17; [The BBC response](#) to the 2022 Consultation, p. 14; [redacted] response to the 2022 Consultation, p. 3.

Three, Vodafone, Virgin Media O2 and another respondent [redacted].³³⁵ The reforms suggested were:

- > changing the net neutrality rules (Virgin Media O2);³³⁶
- > [redacted] (another respondent [redacted]);³³⁷
- > considering revising or expanding the specialised services criteria, pending a review of the net neutrality rules (the Competitive Enterprise Institute);³³⁸
- > replacing the rules with a code of practice similar to that which applied before 2016 (ISPA and Three),³³⁹ and
- > a wide-ranging review of the net neutrality framework by Government and Ofcom (Vodafone).³⁴⁰

10.24 Some respondents also made more detailed comments about our approach covering the following topics:

- comments about the clarity and practicality of the optimisation criteria for specialised services and our draft guidance on those criteria. These covered:
 - > general comments about the optimisation criteria;
 - > establishing the need for optimisation in mobile networks;
 - > improvements to the general standard of internet access such that optimisation is no longer required to meet requirements for a specific level of quality; and
 - > the assessment for new services and applications.
- comments about the clarity and practicality of the network capacity and impact (on internet access services) criteria for specialised services and our draft guidance on those criteria;
- comments about the definition of services which are not publicly available and are therefore out of scope of the net neutrality rules; and
- concerns about the suitability of the specialised services rules for business services and other detailed points about the rules.

10.25 We summarise and review these comments in the discussion about our analysis and decision below.

Our analysis and conclusions

10.26 In this section, we first set out our assessment of the current specialised services rules against our policy objectives and our decision to adopt guidance. We then review each aspect of the specialised services rules describing our interpretation of the rules and the guidance we have decided to give, our consideration of consultation respondents' comments and the changes we have made to address those comments.

³³⁵ [The Competitive Enterprise Institute response](#) to the 2022 Consultation, pp. 9- 11; [ISPA response](#) to the 2022 Consultation, pp. 8- 9; [Three response](#) to the 2022 Consultation, pp. 1, 46-53; [Vodafone response](#) to the 2022 Consultation, pp. 10- 12; [Virgin Media O2 response](#) to the 2022 Consultation, pp. 22- 23; [redacted] response to the 2022 Consultation, pp. 2- 4.

³³⁶ [Virgin Media O2 response](#) to the 2022 Consultation, p. 22.

³³⁷ [redacted] response to the 2022 Consultation, para. 9.

³³⁸ [The Competitive Enterprise Institute response](#) to the 2022 Consultation, p. 9.

³³⁹ [ISPA response](#) to the 2022 Consultation, pp. 8-9; [Three response](#) to the 2022 Consultation, p. 1.

³⁴⁰ [Vodafone response](#) to the 2022 Consultation, pp. 2- 4.

Assessment of the current specialised services rules against our policy objectives

10.27 As set out in Section 4, our review seeks to ensure that the net neutrality framework provides positive outcomes for consumers by means of three objectives:

- i) safeguarding citizens' and consumers' access to the open internet;
- ii) 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
- iii) safeguarding well-run, efficient and robust networks.

10.28 The specialised services rules support these objectives because they aim to:

- i) facilitate innovation by enabling ISPs to provide publicly available optimised services to support content, applications and services which have quality requirements that are not supported by internet access services; and
- ii) act as a safeguard to ensure that specialised services are not used to circumvent the net neutrality framework or to compromise the quality or availability of internet access services.

10.29 To effectively achieve these aims, the specialised services rules must be clear, practicable and not unduly restrictive.

10.30 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.

10.31 However, we consider that the current specialised service framework and ISPs' uncertainty about how it should be interpreted, may be restricting innovation and investment by reducing ISPs' incentives to provide these services. The scale of the effect on innovation is, however, difficult to quantify. As set out in the 2022 Consultation, we used our formal information gathering powers to ask the ISPs (BT Group, Sky, TalkTalk, Three, Vodafone and Virgin Media O2) whether, and if so, in what way, the net neutrality framework had limited or impeded innovation. 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. We consider that four of these, all mobile service innovations, had been limited or impeded by ISPs' interpretation of the specialised services rules.³⁴¹ However, there may have been other prospective innovations which ISPs did not develop or document because they were considered to be contrary to the framework.

10.32 There is a risk that any dampening effect on innovation could be more significant in future, in particular in relation to 5G networks. These are designed to support a wide range of services, including applications such as virtual reality and automotive applications which are likely to require optimisation. Similar concerns may also arise in relation to fixed networks as

³⁴¹ Most of the innovations related to other aspects of the net neutrality framework such as traffic management, zero-rating, retail offers for internet access services with different quality levels, public interest exceptions and terminal equipment restrictions. See para. 8.20 to 8.24 of the 2022 Consultation for further details of the four innovations.

ISPs begin to deploy services to support applications such as enhanced virtual reality and new business/industrial applications.

- 10.33 Uncertainty about how to interpret the requirements 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.
- 10.34 We also consider that 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.
- 10.35 Therefore, we have concluded that the current net neutrality framework appears to, or at least is perceived to, suffer from a lack of clarity and flexibility in relation to specialised services. This may hinder our objectives given the potential benefits from innovation and efficient investment.
- 10.36 We consider this can be addressed by guidance clarifying our interpretation of the specialised services rules and adopting a more flexible approach so that ISPs can provide specialised services more easily and use network resources efficiently, which will more effectively contribute to our objectives. We also address the risk that greater flexibility might lead to adverse outcomes for consumers, particularly in relation to the general quality of internet access.

Assessing requirements against the optimisation criteria

- 10.37 Three, Virgin Media O2 and BT Group commented on the optimisation criteria:
- Three said that ambiguity concerning the optimisation criteria leads to differences in interpretation, the classic example being linear IPTV services and streaming video-on-demand (VoD) services, which share many common characteristics and are widely considered substitutes by consumers. IPTV is generally considered a specialised service whereas VoD is not. However, consumers' viewing experience could be improved if VoD was allowed to use a specialised service (e.g. less buffering and loss of picture quality).³⁴²
 - Virgin Media O2 considered that the optimisation criteria set a high qualifying threshold to use specialised services. It also thought full functionality is subjective and likely to be interpreted differently by stakeholders.³⁴³
 - Virgin Media O2 also considered that establishing optimisation requirements would be burdensome for ISPs as they would need to engage with content providers to satisfy themselves that optimisation is necessary.³⁴⁴
 - BT Group sought confirmation that it would be permissible to offer a specialised service to prioritise traffic for an application over general internet access traffic or guarantee a minimum bandwidth.³⁴⁵

³⁴² [Three response](#) to the 2022 Consultation, p. 48.

³⁴³ [Virgin Media O2 response](#) to the 2022 Consultation, p. 22.

³⁴⁴ [Virgin Media O2 response](#) to the 2022 Consultation, p. 22.

³⁴⁵ [BT Group response](#) to the 2022 Consultation, para. 5b.

- 10.38 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 and applications which may also be accessible using internet access.
- 10.39 This uncertainty may be harming innovation by inhibiting ISPs from providing specialised services that would support content and applications which have specific quality requirements, including those which require additional functionality or a better-quality service than can be supported when they are accessed via the internet.
- 10.40 Therefore, we want to be clear that where there are requirements that cannot be provided, or provided to a sufficient quality, over the general internet access services provided by ISPs, ISPs can provide 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 an internet access service but at a lower quality.
- 10.41 In considering whether a specialised service is needed, ISPs should take into account the “normal operation” of their network, which is the conditions of the network in the absence of exceptional or temporary congestion as discussed in Section 6. Any such assessment should take into account whether the requirements could be met using the internet access service through the use of reasonable traffic management by the ISP. We would not generally expect the need for optimisation to be based on assessing content and application requirements when the network (or parts of the network) is experiencing exceptional or temporary congestion, which should occur infrequently and should be addressed using additional traffic management measures.
- 10.42 We have amended our guidance to provide further detail about our interpretation of quality requirements which may necessitate a specialised service, depending on a case-by-case assessment of the capabilities of the internet access service. In particular, we have clarified that the quality requirements may relate to one or more service characteristics such as bandwidth, latency, jitter, packet loss, security, service assurance or energy consumption. For example, optimisation may be required because the content or application requires:
- A level of performance greater than supported by the internet access service. For example:
 - > a real time application, such as remote surgery, which requires lower latency;
 - > a multicast application with specific quality of service requirements; or
 - > a video application which requires much greater bandwidth to support a higher video resolution.
 - A more consistent or reliable level of performance than supported by the internet access service to operate optimally. For example, telephony and other person to person voice and video applications are typically sensitive to quality variations. This could be an appropriate basis for providing a specialised service.³⁴⁶
 - A high level of service assurance or security because of the nature of the content or application. For example, critical network infrastructure related applications, or machine to machine communications.

³⁴⁶ Excessive latency can cause callers to talk over each other. Excessive latency and packet drop can result in missed words and poor voice quality. Similarly, quality variations can cause video conferencing to freeze or break-up.

- A service designed to suit specific device characteristics. For example, in some machine-to-machine applications, devices may be resource constrained (limited processing power, memory capacity or battery capacity).
- 10.43 More generally, corporate customers may be likely to use content and applications which have quality requirements that are not supported by internet access services.
- 10.44 Therefore, in response to BT Group, a specialised service could be used to prioritise traffic for an application which requires a minimum bandwidth that cannot be supported consistently by an internet access service in normal operation.
- 10.45 Our understanding is that some linear IPTV services have been classified as specialised services because they use multicast technology which, as discussed above, has quality of service requirements that are not supported by general internet access services. In contrast, VoD services are typically designed to use internet access services, utilising various techniques to cope with the variable quality of those services. For example, adaptive bit rate techniques may be used to ensure service continuity by dynamically adjusting video quality to suit connection conditions. Where quality requirements for a particular application preclude the use of such techniques, this could be sufficient to satisfy the optimisation criteria.
- 10.46 We acknowledge that ISPs will need to exercise their judgment when assessing services in accordance with the rules and this may lead to some differences in interpretation. However, one of the main purposes of our guidance is to provide greater clarity about how the rules should be interpreted, including in relation to services provided on mobile networks (as discussed in more detail below).
- 10.47 We do not agree with Virgin Media O2's view that the optimisation criteria set an overly high threshold for specialised services. The specialised services rules safeguard the open internet by restricting the provision of specialised services to content and applications which have quality requirements that are not supported by internet access services. Therefore, we consider that it is appropriate for specialised services to be reserved for specific content and applications where there is a genuine need.
- 10.48 It is not clear to us that establishing optimisation requirements (which may require ISPs to engage with content providers about some content and applications) would be burdensome as Virgin Media O2 has suggested, since we expect that ISPs will need to be very clear about the specific quality parameters of the specialised service needed by the content, application or service and this will require working with content providers.

Establishing the need for optimisation in mobile networks

- 10.49 Three, Vodafone and Virgin Media O2 commented on the practicality and burden of establishing the need for optimisation in mobile networks:
- Three noted that quality of service in mobile networks varies by area, time of day and between networks depending on the technical solution deployed by each ISP. It asked that we amend our guidance to clarify how ISPs should assess quality of service in normal operation in mobile networks. It suggested that we could simplify the assessment process by publishing standard quality of service parameters for internet access services, based on the average quality of a mobile network, against which ISPs could assess optimisation requirements.³⁴⁷

³⁴⁷ [Three response](#) to the 2022 Consultation, pp. 51- 53.

- Vodafone was concerned about the practicality of assessing the optimisation criteria. It proposed that we should specify a comprehensive, but not exhaustive, list of use cases which would be considered to meet the optimisation criteria so that ISPs would not need to assess them individually. Vodafone suggested that the list could include broad categories of services or applications where optimisation is needed to ensure safety, security or functionality. For example, in the areas of digital delivery of health and care, emergency services, real-time surveillance for public bodies, transportation / connected mobility, energy and utilities management, manufacturing, smart cities, education and training, transaction protection, media and entertainment.³⁴⁸

10.50 These comments relate to uncertainty about how the need for optimisation should be established given the variability of quality of service in mobile networks. The alternative approaches suggested would simplify that assessment but, in our view, would be inadequate because optimisation requirements would not be assessed against the quality characteristics of individual internet access services, or the specific requirements of the content or application, but instead against more generalised criteria. In particular:

- **Standardised mobile network performance metrics:** these would represent the average performance of all internet access services on a mobile network. They would therefore be a poor benchmark against which to assess optimisation requirements since they would not reflect the capabilities of the individual internet access service being assessed.
- **List of applications/use-cases deemed to satisfy the optimisation criteria:** to produce such a list, we would need to make assumptions about average or typical internet access service performance characteristics. Therefore, in some respects, this approach would be similar to the standardised network performance metrics and share its limitations. It would also be difficult for us to produce and maintain a comprehensive list of applications, given the rapid pace of change. This could potentially act as a brake on innovation absent greater clarity about the optimisation criteria to enable ISPs to assess applications not on the list.

10.51 We consider that respondents' concerns are best addressed with additional guidance clarifying our approach to establishing optimisation requirements in mobile networks and, as discussed above, providing further detail about our interpretation of quality requirements which may necessitate a specialised service. We consider that a principles-based approach is preferable to prescriptive rules given the rapid pace of technological change.

10.52 As discussed in Section 6, there is inherent variability in the quality of services that mobile networks can consistently achieve in normal operation. There may be localised variations in service quality due to a range of factors including coverage patterns, physical obstructions, the number of users at a particular location and localised capacity constraints which cannot be immediately addressed (e.g. because of difficulty acquiring a new site for equipment).

10.53 This variability of quality delivered by mobile networks may lead to more frequent congestion on a localised basis which could result in the use of additional traffic management measures. However, as explained in Section 6, we consider that the use of these measures across the network on a regular basis is unlikely to be consistent with the rules, and ISPs should be addressing congestion through capacity expansion in the majority

³⁴⁸ [Vodafone response](#) to the 2022 Consultation, p. 11.

of cases. Therefore, as set out above, in assessing the need for a specialised service, ISPs should consider whether an internet access service can meet the requirements during normal operation of the network when it is not experiencing exceptional or temporary congestion. In this assessment they should take into account whether the use of reasonable traffic management is sufficient to meet the service requirements. We would not generally expect the need for optimisation to be based on assessing application requirements against conditions at only a small minority of cells on the network.

Improvements to the general standard of internet access services such that optimisation is no longer required to meet requirements for a specific level of quality

- 10.54 The general standard of internet access services is expected to improve over time in response to consumer demand and in line with developments in technology. Such improvements may obviate the need for specialised services to support certain content and applications – when improvements to an internet access service render optimisation unnecessary, the specialised service must be withdrawn.
- 10.55 Three said that the optimisation criteria create uncertainty and acts as a disincentive to investment because improvements in the general standard of internet access services could result in some specialised services being no longer objectively necessary. It also argued that ISPs should be permitted to continue to provide specialised services for multiple years after they are no longer objectively necessary to ensure they make a return on their investment.³⁴⁹ We do not agree with these arguments. The quality parameters of internet access services are set by ISPs, consequently they exercise a degree of control over upgrades which would trigger the withdrawal of specialised services. Moreover, when upgrades enable internet access services to meet quality requirements, it is unlikely that content providers and end-users would want to retain their specialised services even if it were permissible for ISPs to offer them.
- 10.56 While in some cases, usage of a specialised service may lapse naturally as a result of such improvements, for example when an end-user upgrades to a better internet access service, we recognise there may be circumstances when it may be appropriate for ISPs to manage the withdrawal of a specialised service over time. In these cases, ISPs should have a reasonable withdrawal process in place taking account of the need for customers of the service to make any necessary changes to their services or applications.

Assessment of requirements for new applications

- 10.57 Vodafone said that requiring ISPs to undertake service trials to establish optimisation requirements is unnecessary and would impose an undue burden on ISPs.³⁵⁰
- 10.58 The requirements of new content and applications and their need for optimisation may not be fully understood until the specialised service has been launched and gained a degree of maturity. However, ISPs should be able to demonstrate a reasonable expectation of a need for optimisation. As referenced by Vodafone, service trials are one way of establishing those requirements. We have amended our guidance to make clearer that other methods such as technical assessments are also acceptable.

³⁴⁹ [Three response](#) to the 2022 Consultation, p. 52.

³⁵⁰ [Vodafone response](#) to the 2022 Consultation, p. 11.

Conclusion on our approach to assessing services against the optimisation criteria

- 10.59 Specialised services may only provide access to specific content or applications 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. This should address the risk that that the open internet could be undermined by offering specialised services as a replacement for internet access services.
- 10.60 Specialised services may provide access to content or applications which are accessible using the ISP's internet access service, provided that it is optimised to provide additional functionality or a better quality service than can be supported by the internet access service. ISPs may offer specialised services to content providers but must not require content providers to use such services to deliver their traffic.
- 10.61 We consider that the optimisation requirements are likely to be met if an ISP is able to demonstrate that:
- i) the specialised service provides access to specific content or applications and is optimised for such content or applications;
 - ii) the content or application has quality requirements which necessitate optimisation because they cannot be met consistently by the internet access service during normal operation, for example by identifying the quality parameters which are not supported by the internet access service and the effect on the service if it is not optimised (that is the features which would not function fully if delivered by general internet access);³⁵¹
 - iii) normal operation should be interpreted to include the application of any applicable reasonable traffic management measures.
- 10.62 The requirements of new content or applications and their need for optimisation may not be completely understood until the specialised 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, technical assessments or service trials.
- 10.63 The quality requirements may relate to one or more service characteristics such as bandwidth, latency, jitter, packet loss, security, service assurance or energy consumption.
- 10.64 The general quality of internet access services is expected to continue to improve over time in response to consumer demand and in line with developments in technology. Such improvements may obviate the need for specialised services to support certain content or applications. Consequently, the specialised service must be withdrawn.

Assessing specialised services against the network capacity and impact criteria

- 10.65 Specialised services may only be offered where:

³⁵¹ 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).

- i) sufficient network capacity has been provided to support the provision of the specialised service in addition to any internet access service (the network capacity criterion); and
- ii) the specialised service is not detrimental to the availability or general quality of internet access services for end-users (the impact criterion).

10.66 Five respondents to the 2022 Consultation commented on the network capacity and impact criteria for specialised services:

- techUK, Three, Vodafone, Virgin Media O2 and a confidential respondent [X] commented about the application of the impact criterion to mobile networks.³⁵² The main points were:
 - > the inherent variability of quality of service in mobile networks makes it difficult to measure the quality of internet access services and to determine whether detrimental impacts are due to specialised services or other factors. There is also an element of subjectivity as some impacts may be negligible or imperceptible to end-users;
 - > there is always some interplay between services in mobile networks due to the shared nature of network capacity. If the impact criterion is interpreted narrowly, all specialised services could be judged detrimental to internet access services. Absent further clarification about Ofcom’s interpretation, uncertainty would deter investment in new services.
- Three suggested that impacts on internet access services could be assessed against standard quality of service metrics for mobile internet access services published by Ofcom in line with Three’s proposal for optimisation requirements.³⁵³
- Vodafone said that expecting ISPs to be able to demonstrate that they had dimensioned their networks to capacity forecasts would not be operationally practical and would deter the deployment of network slicing. It suggested that the focus should be on network performance in aggregate, utilising existing network performance measures to monitor performance before and after the introduction of specialised services. Vodafone also suggested that it would not be appropriate to expect ISPs to forecast capacity requirements before the launch of specialised services. Take-up is often uncertain and it would need to respond to additional traffic demands after launch. In such circumstances, capacity would be managed sensibly in line with evolving network demand.³⁵⁴

10.67 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 services is prohibited. This is very difficult to achieve in practice in a multi-service network where prioritisation mechanisms are used to manage network resources shared between internet access services and specialised services.

³⁵² [techUK response](#) to the 2022 Consultation, pp. 11-12; [Three response](#) to the 2022 Consultation, p. 49; [Vodafone response](#) to the 2022 Consultation, p. 10; [Virgin Media O2 response](#) to the 2022 Consultation, p. 22; [X] response to the 2022 Consultation, para. 42-44.

³⁵³ [Three response](#) to the 2022 Consultation, pp. 52-53.

³⁵⁴ [Vodafone response](#) to the 2022 Consultation, pp. 11- 12.

- 10.68 We agree with respondents that if the impact criterion is interpreted narrowly, specialised services provided on mobile networks could be judged to be detrimental to the general quality of internet access services – given the shared nature of capacity, the addition of a specialised service could be seen as reducing network capacity available for internet access services and therefore their quality.
- 10.69 Concerns about the interpretation of the impact criterion 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.
- 10.70 We also acknowledge that the inherent variability in the quality of service that mobile services can consistently achieve (due to the nature of mobile networks) coupled with the shared nature of capacity, may make it difficult to measure detrimental impacts on mobile internet access services and to attribute them to specialised services.
- 10.71 Concerns about the interpretation of the impact criterion 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.
- 10.72 In our view, a narrow interpretation of the impact criterion would not be appropriate as it would not take account of the capabilities and limitations of mobile networks and potentially other types of networks. It would also be contrary to our objectives as it could significantly limit the provision of specialised services on mobile networks.
- 10.73 We provide greater clarity about our interpretation of the network capacity and impact criteria below.

Assessing whether sufficient capacity has been provided to support the provision of specialised services in addition to any internet access services

- 10.74 We would expect ISPs to be able to demonstrate that sufficient capacity has been provided to support their specialised services in addition to any internet access services.
- 10.75 As respondents have pointed out, ISPs have strong incentives to maintain the quality of their services and have processes to achieve this. ISPs have told us that service quality management and capacity planning/management for mobile networks is typically undertaken on an aggregate basis, rather than forecasting capacity requirements for individual services.³⁵⁵ Network performance and utilisation measures are used to monitor performance, and identify network elements with high utilisation requiring additional capacity to accommodate traffic growth. Thus, mobile network capacity is normally provided ahead of demand so that the quality of existing services is maintained within acceptable limits as additional services are added.
- 10.76 This feedback illustrates that there are multiple approaches to network capacity planning/management and service assurance and that the optimal approach for a particular ISP may depend on the type of network and network technology. Also, ISPs may not use the

³⁵⁵ Further, as Vodafone has pointed out, it may not always be possible to forecast capacity requirements accurately for new specialised services due to uncertainty about take-up.

same approach in all parts of their networks. Therefore, we consider the following approaches could be acceptable ways for ISPs to ensure sufficient capacity is available:

- deploying additional capacity in accordance with a capacity forecast which takes account of the demand for specialised services and internet access services; or
- monitoring traffic growth in individual network elements and deploying additional capacity to keep ahead of demand.

10.77 Our view is that ISPs' normal network capacity planning/management and service quality assurance processes are appropriate mechanisms by which they can ensure sufficient network capacity is available. As such, it is important that we monitor the application of these processes to provide evidence about whether ISPs are complying with their requirements. We have modified our guidance to better reflect this view.

10.78 Where ISPs undertake network performance monitoring at an aggregate level, we would generally expect this to be sufficient to track where additional capacity is required to maintain performance of all services without requiring additional measures to also be monitored as standard. We discuss our approach to monitoring ISPs network performance and how this data is used to maintain the quality of services in Section 12.

Assessing the impact of specialised services on the availability and general quality of internet access services

10.79 Concerns were raised about the practicality and subjectivity of the impact criterion in connection with assessments that focus on determining whether specialised services have had an adverse impact on internet access services (i.e. whether they have been detrimental to the availability and general quality of internet access services).

10.80 In our view, it is preferable that assessments should focus on whether the quality of internet access services has been maintained as this should be more straightforward to measure and should already be monitored by ISPs.

10.81 We would 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 are maintained. 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 quality levels, we would expect quality to be maintained on all of its services.

10.82 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.

10.83 Where a specialised service is offered and an ISP uses traffic management in relation to general internet access services, we would be unlikely to consider this alone 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 net neutrality rules.³⁵⁶

³⁵⁶ We set out our approach to traffic management in Section 6.

- 10.84 As discussed above there is inherent variability in the quality of service of internet access services supported by mobile networks. Variation in quality across the network would not normally be considered to indicate that the presence of a specialised service is detrimental to the availability or general quality of internet access services.
- 10.85 Standardised quality of service metrics for mobile internet access services, compiled by Ofcom, could provide a mechanism for monitoring the general quality of internet access services as Three has suggested. However, as they provide an aggregate view of mobile internet access service quality (across all mobile networks, or individual mobile networks), we consider they would be insufficiently granular for use by individual ISPs to monitor the impact of specialised services on internet access services.
- 10.86 For completeness, we have also extended our guidance to cover our approach to cases where an access connection serving an individual end-user has limited capacity and cannot be easily upgraded, such that it is not possible to provide a specialised service unless the bandwidth of the end-user's internet access service is reduced to accommodate it. This would not be considered detrimental to the general quality of the internet access service in a way that would be contrary to Article 3(5). However, pursuant to Article 4(1) of the net neutrality rules and General Condition C1, ISPs must provide the end-user with certain information about the service characteristics of their internet access service, including a clear and comprehensive explanation of the impact that the specialised service might in practice have.

Concerns that greater flexibility to provide specialised services could pose a risk to the open internet

- 10.87 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, 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 services do not consistently support certain functions.
- 10.88 We consider that the net neutrality rules sufficiently protect against this risk. In particular, the rules require ISPs to ensure that specialised services are not detrimental to the availability or general quality of internet access services.³⁵⁷ The rules also further protect the open internet by specifying that specialised services must not be offered as or be usable as replacements for internet access services.
- 10.89 Article 5(1) of the net neutrality rules also places a duty on Ofcom to monitor compliance with the net neutrality rules, including the specialised services rules, and to promote the continued availability of non-discriminatory internet access services at levels of quality that reflect advances in technology. As we discuss in more detail below, pursuant to this duty, we intend to monitor the impact of specialised services on the general quality and availability of internet access services as part of our ongoing monitoring programme.
- 10.90 The net neutrality rules also include provisions for Ofcom to impose requirements on internet access services concerning the technical characteristics, minimum quality of service

³⁵⁷ As noted above, we would be most likely to consider undertaking an assessment of the impact of a specialised service on internet access services where the introduction of a specialised service has an ongoing effect on the quality of the ISP's internet access services, particularly where the ISP has indicated that a content provider should use a specialised service to guarantee traffic delivery.

requirements, and other appropriate and necessary measures to ensure compliance with Articles (3) and (4) of the net neutrality rules and to promote the continued availability of non-discriminatory internet access services at levels of quality that reflect advances in technology.³⁵⁸ 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.

Conclusion on assessing specialised services against the network capacity and impact criteria

- 10.91 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 services for end-users.
- 10.92 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 services. Our view is that ISPs' normal network capacity planning/management and service quality assurance processes could be an appropriate approach and so we will monitor these to ensure compliance with the network capacity and impact criteria. We have modified our guidance to better reflect this view.
- 10.93 We would consider the impact of a specialised service to be detrimental to the availability or the general quality of internet access services if it causes the quality of internet access services 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 services to degrade significantly.
- 10.94 There is inherent variability in the quality of service of internet access services supported by mobile networks. Variation in quality across the network would not normally be considered to indicate that the presence of a specialised service is detrimental to the availability or general quality of internet access services.
- 10.95 We discuss our approach to monitoring ISPs network performance and how this data is used to maintain the quality of services in Section 12.

Clarifying which services are subject to the specialised services rules

- 10.96 The specialised services rules apply to services which are publicly available.
- 10.97 We note that one of the perceived barriers to the provision of new services is uncertainty about which services are not publicly available and therefore outside the scope of the net neutrality rules.
- 10.98 To make it easier for ISPs to determine which services fall outside the scope of the net neutrality rules, we have therefore decided to adopt guidance about our interpretation of the relevant definitions in the net neutrality rules, consistent with previous guidance on the

³⁵⁸ Section 7 of the [Open Internet Access \(EU Regulation\) Regulations 2016](#) as amended by the [Open Internet Access \(Amendment etc.\) \(EU Exit\) Regulations 2018](#).

interpretation of publicly available electronic communications services.³⁵⁹ Our guidance specifies that:

- we interpret publicly available services to be services which are generally available to end-users;
- 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 used to provide services 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).

10.99 BT Group asked us to clarify whether services considered not publicly available (and therefore outside the scope of the net neutrality rules) could include services provided over a public network and whether two examples would be considered not to be publicly available:

- if a limited group of corporate customers asked BT Group to optimise [3x] to enable their employees to use the service on the move with lower risk of degradation;
- optimised connectivity for [3x] which can be operated only by employees of a private firm.³⁶⁰

10.100 The use of a public network to provide a service does not preclude it being classified as not publicly available. Public networks are typically designed to support a wide range of services, so we would expect this to be commonplace. A service would typically be considered publicly available if all (or the majority of) existing and potential customers (for example, corporate customers) could request the service, even if only a subset did request it.

Calls for reform or repeal of the specialised services rules and the wider net neutrality framework

10.101 As set out above, several respondents to the 2022 Consultation expressed concern that barriers to innovation would remain and so repeal of the net neutrality rules was needed. We have updated our guidance to address the points about clarity and practicality raised by respondents. We consider that with these changes, the net neutrality rules and our guidance should not unduly impede the provision of specialised services on fixed or mobile networks. However, any changes to the rules themselves would be a matter for the Government and Parliament to consider. We discuss this further in Section 13.

Other points raised by 2022 Consultation respondents

10.102 In this section, we address other comments made by respondents to the 2022 Consultation.

³⁵⁹ Oftel, 2003. [Guidelines for the interconnection of public electronic communications networks](#), chapter 6.

³⁶⁰ [BT Group response](#) to the 2022 Consultation, p. 5.

Suitability of the specialised services rules for business services

- 10.103 ISPA noted that prior to the introduction of the net neutrality rules, the BSG’s Open Internet Code of Practice and Ofcom’s Approach to Net Neutrality had an explicit focus on consumer services.³⁶¹ Business services tend to be highly tailored and designed to support innovation. Its members were concerned that the approach to specialised services in the current net neutrality framework is insufficiently flexible to accommodate business services. It suggested that services provided to large businesses should be exempted from the specialised services rules or failing that we should clarify the application of the rules to such services.³⁶²
- 10.104 The net neutrality rules do not make any explicit distinction between services provided to consumers and businesses. However, as set out above, they effectively exempt some services provided to businesses because they apply only to publicly available services. Businesses often have demanding or specialised requirements and are therefore likely to purchase bespoke services which are not publicly available (i.e. not made generally available to businesses).
- 10.105 Publicly available business services fall within the scope of the net neutrality rules as there is no applicable exemption or exception for business services. Given the need to safeguard the open internet we do not consider that there is a strong case for such an exemption. Further, excluding services provided to businesses from the net neutrality rules would require an amendment to the Regulation, which would be a matter for the Government and Parliament to consider.
- 10.106 Our guidance should address some of ISPA’s concerns about the clarity of the rules. It clarifies our interpretation of the specialised services rules and adopts a more flexible approach which should make it easier for ISPs to provide specialised services to businesses. It also includes guidance about assessing whether a service is publicly available.

Comments about fixed IP telephony services

- 10.107 A consultation respondent [X] noted that we referred to fixed and mobile telephone services as applications optimised to meet quality and reliability requirements.³⁶³ They queried this statement, noting that [X]. They were concerned that ISPs might [X].³⁶⁴
- 10.108 It would not be possible for an ISP to [X] as [X] has suggested. [X].

Comments about technical barriers to use of specialised services

- 10.109 A consultation respondent [X] welcomed the clarity provided by our guidance concerning [X]. However, it considered that [X].³⁶⁵
- 10.110 We note [X]’s comments, however, matters pertaining to mobile operating systems fall outside the scope of this review.

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

³⁶¹ Ofcom 2011, [Ofcom’s approach to net neutrality](#).

³⁶² [ISPA response](#) to the 2022 Consultation, p. 7.

³⁶³ Ofcom, 2022. [Consultation: Net neutrality review](#), para 9.60.

³⁶⁴ [X] response to the 2022 Consultation, pp. 3-4.

³⁶⁵ [X] response to the 2022 Consultation, pp. 5-6.

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 network 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 or applications 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 services in accordance with Article 3(5) of the net neutrality rules and our guidance.
- Services providing premium quality internet access. These would be classified as internet access services under the net neutrality framework. ISPs must ensure that such services comply with Article 3(3) of the net neutrality rules concerning the equal treatment of traffic.

Our approach to monitoring and assessing the impact of specialised services on internet access

10.111 In light of our supervision and enforcement duties set out in Article 5 of the net neutrality rules, we will monitor the impact of specialised services on the availability and general quality of internet access services as part of our monitoring programme.

10.112 We have set out our overall approach to monitoring and discuss consultation respondents' comments in Section 12.

10.113 As discussed in Section 12, we intend to gather certain information on a regular basis. This includes information relevant to our monitoring of specialised services:

- **Network performance metrics** to allow us to assess the general quality of internet access services being provided by ISPs. This information will also provide a baseline against which we can assess the impact of specialised services. As also discussed in Section 12, we expect this to be based on regular reporting that ISPs carry out internally where possible to minimise the additional burden on ISPs.
- **Specialised services:** a summary of the content or application to which the offer applies and the likely level of traffic, along with information on how the service is

managed where this is not already set out in the information that we will gather about ISPs general traffic management policy.

10.114 In addition to this ongoing monitoring and reporting, we will gather data on a case-by-case basis to support assessments where we have concerns of compliance with the rules, including where end-users, content providers or other stakeholders identify particular concerns to us. We would expect ISPs to be able to provide the following information about specialised services throughout the period that they are available and for eighteen months afterwards:

- i) information about the ISP's assessment that a specialised service is needed (for example data on the ISP's assessment of the need for optimisation); and
- ii) information about how network capacity is managed so that the Specialised Service does not negatively impact on internet access services.

11. The impact of allowing internet service providers to charge content providers

Introduction

- 11.1 This section considers the case for enabling ISPs to charge content providers for carrying or prioritising general internet access traffic to end-users. The issue of charging has specifically been raised with us in the context of this review. This policy debate provides important context for our work because the introduction of a charging regime could have implications for net neutrality and in relation to Ofcom's objectives to safeguard well-run, efficient and robust networks. We note that whether or not a charging regime should be introduced in the UK is a decision for Government and Parliament.
- 11.2 We set out here our views on the merits of a charging regime based on evidence provided to us. 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. Further, the changes we are making to our guidance in relation to other aspects of the rules, including traffic management and specialised services, provide flexibility that could help mitigate several issues identified by ISPs as potential justifications for a charging regime.
- 11.3 In this section we consider the following:
- Firstly, we describe the extent to which ISPs have the ability to charge ISPs both in the UK and in different jurisdictions outside the UK.
 - Secondly, we assess the likely impacts of ISPs charging content providers for carrying traffic to end-users. We first set out the issues raised by stakeholders and the arguments for and against a charging regime. In assessing the likely impacts, we consider the extent to which charging for carrying traffic to end-users would allow for networks to be managed more efficiently, the extent to which transfers would occur between ISPs, content providers and consumers, and the impact on investment in networks. We also identify some practical challenges and unintended consequences of ISPs charging content providers for carrying traffic to end-users.
- 11.4 We do not consider whether charging would be an appropriate measure to achieve broader public policy objectives, such as those relating to fixed and mobile network coverage targets, as this is outside the scope of our net neutrality review.

The ability of ISPs to charge content providers

The UK framework

- 11.5 Under the current net neutrality framework, there is no express prohibition on ISPs charging content providers for carrying their traffic as part of providing an internet access service in the UK. Nonetheless, ISPs are effectively unable to impose charges on content providers

since there is no legal or regulatory obligation on content providers to negotiate with ISPs and, in practical terms, content providers do not need to engage with ISPs for their traffic to be carried.³⁶⁶ It is the operation of Articles 3(1) and 3(3) of the Regulation that effectively limits the ability of ISPs to credibly require content providers 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 content provider’s content in a discriminatory way or on the basis of commercial considerations.^{367 368}

- 11.6 ISPs and content providers are able to interconnect their networks to exchange traffic in different ways. These include directly interconnecting through peering, or indirectly, through a third-party transit network or a commercial Content Delivery Network (CDN) (see Section 3). In addition to this, content providers can agree with an ISP to co-locate its own caches in the ISP’s network.³⁶⁹ IP interconnection falls outside of the net neutrality regulations and in reaching commercial agreements ISPs may charge content providers for IP interconnection and co-location, although, as noted later in this section, this is often ‘settlement free’ and these charges account for a very small proportion of network costs (see Figure 11.1). Our discussion of charging elsewhere in this section therefore focusses on ISPs charging content providers for carrying traffic to end-users that the net neutrality rules prevent.

International experience

- 11.7 The question of whether content providers should contribute to ISPs’ network costs for the use of their networks is a topical policy issue in several jurisdictions. A number of stakeholders including BT Group, Vodafone, Virgin Media O2, and Three have suggested to us that this international debate could be relevant to our review of the net neutrality framework and argued that other markets with less intrusive forms of net neutrality do not exhibit consumer harm.³⁷⁰
- 11.8 With the exception of interconnection charges, we are aware of relatively few circumstances internationally which could be characterised as content providers being charged fees by ISPs for carrying their traffic to end-users. While there are examples of countries where we understand interconnection charges to be more prevalent or material, such as France and Germany,³⁷¹ we found limited examples of this. In the examples we could find of payments

³⁶⁶ Moreover, the scope of the net neutrality rules is limited to ISPs and does not place any obligations on content providers.

³⁶⁷ 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.

³⁶⁸ 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.

³⁶⁹ See Annex 3 for details of the frequency of use for each means of interconnection.

³⁷⁰ See for example, [BT Group response](#) to the 2022 Consultation, p. 17; [Vodafone response](#) to the 2022 Consultation, p. 3; [Three response](#) to the 2022 Consultation, p. 15; [Virgin Media O2 response](#) to the 2022 Consultation, p. 10.

³⁷¹ In particular, we understand that certain ISPs in these countries tend to focus on interconnection with other ISPs only, such that the traffic between interconnecting partners is more symmetric.

from content providers 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 content providers to ISPs below (more detail can be found in Annex 2).

- 11.9 In South Korea, we understand it is commonplace for content providers and ISPs to privately negotiate bilateral commercial contracts relating to network access. However, it is unclear how to characterise such negotiations, with some stakeholders suggesting that they consider such arrangements to be an interconnection or access charge, and not a charge for carrying the traffic itself.³⁷²
- 11.10 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.³⁷³ 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.
- 11.11 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 content providers fees related to the management of their traffic.
- 11.12 We note that there is a live international debate, including within the EU and the US, about whether content providers should make a contribution that would support network roll-out or upgrades.
- 11.13 The European Commission launched an exploratory consultation in February 2023 that aimed to gather views on the changing technological and market landscape and how it might affect the sector for electronic communications.³⁷⁴ It published a summary report of the results of the consultation in October 2023.³⁷⁵ The summary indicated that responses to the consultation have provided largely opposing views as to the need for a charging regime:
- On the one hand, the consultation found that some respondents, primarily network providers, supported a mandatory system of direct payments from content providers to contribute to the financing of network deployment in order to address the perceived imbalanced bargaining power between them and content providers.³⁷⁶ We note that in their joint response to the consultation, the trade associations GSMA and ETNO called for a regulatory intervention to ensure

³⁷² Telefonica, 2023. [Myths and Truths about Korean IP Interconnection System in Overseas Reports](#), p. 1.

³⁷³ 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](#).

³⁷⁴ European Commission, 2023. [The future of the electronic communications sector and its infrastructure](#) [accessed 2 October 2023].

³⁷⁵ European Commission, 2023. [Summary Report on the results of the exploratory consultation](#).

³⁷⁶ European Commission, 2023. [Summary Report on the results of the exploratory consultation](#), p. 18.

large content providers ‘fairly’ contribute to network deployment that will help address a network investment gap in Europe and help the EU meet its Digital Decade targets. They proposed a framework that “allows balanced negotiations between telcos and large traffic generators who obtain the most benefit from telecom investment, while creating a high cost burden with their traffic and exerting disproportionate power across markets”.³⁷⁷ If no agreement among parties was reached then they foresaw the need for a third party arbitration mechanism. The GSMA and ETNO argued that a regime based only on bargaining would be unlikely to work given the “significant differences in bargaining power” between ISPs and content providers.³⁷⁸

- On the other hand, the consultation summary stated that the majority of respondents (mainly digital platforms, CDNs, consumer organisations and citizens) opposed a mandatory mechanism of direct payments from content providers to contribute to the financing of network deployment.³⁷⁹ We note that in its response to the exploratory consultation, BEREC stated that it had previously expressed reservations about mandatory financial contributions from content providers to ISPs in the form of a sending party network pays model (SPNP).³⁸⁰ In its earlier preliminary assessment, BEREC stated that it found no evidence of ‘free riding’ and that content providers and ISPs were mutually dependent on each other. It was concerned that a SPNP model “would allow ISPs to exploit the termination monopoly and this could cause significant harm to the internet ecosystem” and so any market intervention would require an adequate justification.³⁸¹

11.14 In the USA, there is currently no net neutrality framework at the federal level. However, the Federal Communications Commission (FCC) voted in favour of starting proceedings to restore net neutrality rules at the federal level in October 2023.³⁸² While not formal policy, a recent FCC report discussed an idea advocated by some stakeholders of requiring ‘edge providers’ (e.g. video streaming providers, digital advertising firms, and cloud services companies) to contribute to the Universal Service Fund to ensure, amongst other objectives, the universal availability of voice and broadband services.^{383 384}

Our assessment

11.15 We consider that while the net neutrality rules restrict the ability of ISPs to impose charges on content providers, the fact that interconnection fees (where charging is permitted) are often ‘settlement free,’ indicates that other factors unrelated to net neutrality, such as differences in bargaining power between certain content providers and ISPs, are also likely

³⁷⁷ GSMA and ETNO, 2023, [Summary of the Joint Telecom Industry Response to the EU consultation on “The future of the electronic communications sector and its infrastructure,”](#) p. 3.

³⁷⁸ GSMA and ETNO, 2023, [Summary of the Joint Telecom Industry Response to the EU consultation on “The future of the electronic communications sector and its infrastructure,”](#) p. 8.

³⁷⁹ European Commission, 2023. [Summary Report on the results of the exploratory consultation,](#) p. 17.

³⁸⁰ BEREC, 2023. [BEREC’s Response to the Exploratory Consultation,](#) p. 10.

³⁸¹ BEREC, 2022. [BEREC preliminary assessment of the underlying assumptions of payments from large CAPs to ISPs,](#) p. 5.

³⁸² Federal Communications Commission, 2023. [FCC to Start Proceeding on Reestablishing Open Internet Protections](#) [accessed 20 October 2023].

³⁸³ Federal Communications Commission, 2022. [Report on the Future of the Universal Service Fund.](#)

³⁸⁴ The Universal Service Fund is currently paid for by contributions from providers of telecommunications services based on an assessment of their interstate and international end-user revenues. The providers are permitted by the FCC to pass through the fees to their end users.

to affect ISPs' ability to charge content providers. The EU debate around charging, in which ISPs have called for regulatory interventions to address imbalances in bargaining power, is consistent with this conclusion. Our discussion on the practical challenges of a charging regime later in this section considers this in further detail and explains the implications for the design of any charging regime.

Our view on the likely impacts of ISPs charging content providers for carrying traffic to end-users

Our 2022 Consultation

- 11.16 In our 2022 Consultation we set out our views on the possibility of allowing ISPs to charge content providers for carrying traffic. We noted that while there are potential benefits to a charging regime, we had not yet seen sufficient evidence that this is needed and we stated that we believed that there is sufficient flexibility provided for ISPs in our other proposals.³⁸⁵
- 11.17 This section explains our view of the likely impact of the introduction of a charging regime for carrying traffic to end-users. We first provide an overview of the issues raised by stakeholders in response to our 2022 Consultation, and then consider the likely impacts of charging on efficiency, transfers and investments, as well as the practical challenges and potential unintended consequences of a charging regime.

Stakeholder responses

- 11.18 Some ISPs (BT Group, Vodafone, Three, TalkTalk, Virgin Media O2) and the Institution of Engineering and Technology argued in response to our 2022 Consultation that ISPs should be allowed to charge content providers for delivering or prioritising traffic to end-users across their networks.³⁸⁶ They stated that the internet is a two-sided market, with one side being consumers who want to consume content, and the other side being content providers who want to reach consumers.³⁸⁷ They considered the current net neutrality rules which prohibit charging arrangements on one side of the market (between an ISP and a content provider) leads to a number of related concerns:
- reduced incentives for content providers to make efficient use of networks, noting that content providers can choose the method, timing and technology of how traffic is delivered, which can increase ISPs' networks costs;³⁸⁸
 - these higher costs must be recovered through higher charges to retail customers;³⁸⁹ and

³⁸⁵ Ofcom, 2022, Net Neutrality Review Consultation, p. 2.

³⁸⁶ [BT Group response](#) to the 2022 Consultation, p. 3; [Vodafone response](#) to the 2022 Consultation, p. 4; [Three response](#) to the 2022 Consultation, p. 30; [TalkTalk response](#) to the 2022 Consultation, p. 3; [Virgin Media O2 response](#) to the 2022 Consultation, p. 25; [Institution of Engineering and Technology response](#) to the 2022 Consultation, p. 1.

³⁸⁷ [BT Group response](#) to the 2022 Consultation, p.3; [Institution of Engineering and Technology response](#) to the 2022 Consultation, p. 2; [Three response](#) to the 2022 Consultation, p. 31; [Vodafone response](#) to the 2022 Consultation, p. 4; [Virgin Media O2 response](#) to the 2022 Consultation, p. 9.

³⁸⁸ [BT Group response](#) to the 2022 Consultation, p. 13; [TalkTalk response](#) to the 2022 Consultation, p. 4; [Three response](#) to the 2022 Consultation, p. 34; [Virgin Media O2 response](#) to the 2022 Consultation, p. 11.

³⁸⁹ [Three response](#) to the 2022 Consultation, p. 32; [Vodafone response](#) to the 2022 Consultation, p. 4; [Virgin Media O2 response](#) to the 2022 Consultation, p. 8.

- 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.³⁹⁰

11.19 In contrast, a number of content providers, including Sky (which is also an ISP), the BBC, Google, ITV, Meta, Amazon, and Netflix expressed concerns about a regime that would allow ISPs to charge content providers for carrying traffic to end-users.³⁹¹ 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 content providers and could limit the funds available for investment and innovation in content and services;³⁹² and
- encourage ISPs to increase scarcity in network capacity to increase the prices they could charge content providers for carrying traffic.³⁹³

11.20 Content providers also challenged some of the arguments put forward by ISPs that supported charging for carrying traffic to end-users. Content providers argued that:

- they have an incentive for traffic to be delivered efficiently and avoid congestion in order to ensure that their users have a high-quality experience, and they work with ISPs to deliver traffic efficiently, and make substantial investments to assist with this;³⁹⁴
- ISPs have continued to be able to invest sufficiently in their networks;³⁹⁵
- ISPs have failed to incentivise or encourage their customers to use networks more responsibly/consume less data;³⁹⁶ and
- investments made by content providers benefit ISPs by increasing demand for ISPs' services.³⁹⁷

11.21 We next describe the likely impacts of charging on efficiency, transfers and investments, as well as the practical challenges and potential unintended consequences of a charging regime. Our discussion includes more detail on stakeholder views, as well as a description of the evidence gathered and our assessment.

³⁹⁰ [BT Group response](#) to the 2022 Consultation, p. 2; [TalkTalk response](#) to the 2022 Consultation, p. 4; [Three response](#) to the 2022 Consultation, p. 37; [Virgin Media O2 response](#) to the 2022 Consultation, p. 10.

³⁹¹ [Sky response](#) to the 2022 Consultation, p.1; [The BBC response](#) to the 2022 Consultation, p.3; [Google response](#) to the 2022 Consultation, p. 2; [ITV response](#) to the 2022 Consultation, p. 1; [Meta response](#) to the 2022 Consultation, pp. 3-5; [Amazon response](#) to the 2022 Consultation, p. 4; [Netflix response](#) to the 2022 Consultation, pp. 1-2.

³⁹² [ITV response](#) to the 2022 Consultation, p. 3; [The BBC response](#) to the 2022 Consultation, p. 7.

³⁹³ [The BBC response](#) to the 2022 Consultation, p. 7.

³⁹⁴ [Amazon response](#) to the 2022 Consultation, pp. 2-4; [The BBC response](#) to the 2022 Consultation, p. 6; [Google response](#) to the 2022 Consultation, p. 5; [Meta response](#) to the 2022 Consultation, p. 4; [Netflix response](#) to the 2022 Consultation, p. 1; [Sky response](#) to the 2022 Consultation, p. 1.

³⁹⁵ [ITV response](#) to the 2022 Consultation, p. 1; [The BBC response](#) to the 2022 Consultation, p. 6; [Netflix response](#) to the 2022 Consultation, p. 2; [Sky response](#) to the 2022 Consultation, p. 2.

³⁹⁶ [ITV response](#) to the 2022 Consultation, p. 1.

³⁹⁷ [The BBC response](#) to the 2022 Consultation, p. 6; [Meta response](#) to the 2022 Consultation, p. 3; [ITV response](#) to the 2022 Consultation, p. 3; [Google response](#) to the 2022 Consultation, p. 3.

Impact of a charging regime on efficiency

11.22 We first assess the potential impact of a charging regime on the efficiency of market operation. There are two concepts of market efficiency that are relevant to this discussion: productive efficiency (that is, where output - in this case, the delivery of traffic on networks - is delivered at the lowest possible cost); and allocative efficiency (that is, where resources are allocated to their most valued use).

Stakeholder responses

11.23 Stakeholder responses to our 2022 Consultation set out the following:

- ISPs recognised that in many circumstances content providers did engage with them to try and achieve efficient traffic delivery.³⁹⁸ However, ISPs considered that the incentives of content providers to deliver traffic efficiently (either in terms of when they deliver traffic or how they deliver traffic) are limited, and that content providers will only do this when it is in their own interests.³⁹⁹ ISPs identified ‘bad actors’ who do not engage with them or noted scope for content providers to improve the efficiency of their traffic delivery.⁴⁰⁰
- Content providers argued that they have an incentive to ensure efficient traffic delivery, such that their customers have a high-quality experience and identified a range of investments (such as in CDNs and in technological solutions, for example adaptive bit rate technology) that they have made and actions that they have taken (such as planning high traffic events with ISPs) to improve the efficiency of traffic delivery.⁴⁰¹

11.24 The views in relation to efficiency raised with us cover aspects of both productive and allocative efficiency. In relation to productive efficiency, submissions have been made in relation to how the actions of content providers have led to ISPs having to overinvest in networks. In relation to allocative efficiency, as noted above, ISPs have generally characterised the supply of the internet as a two-sided market, and made representations as to how the lack of pricing signals on one side of the market leads to allocative inefficiency.

11.25 The economic concepts and current debate relating to issues around productive and allocative efficiency are explained in further detail in Annex 4. This section outlines the evidence we have seen in relation to the scale of any inefficient use of networks, the extent to which content providers are already acting to mitigate this, how a charging regime might affect their behaviour and how other recommendations should assist with efficient traffic delivery.

³⁹⁸ [BT Group response](#) to the 2022 Consultation, p. 13.

³⁹⁹ [BT Group response](#) to the 2022 Consultation, p. 13.

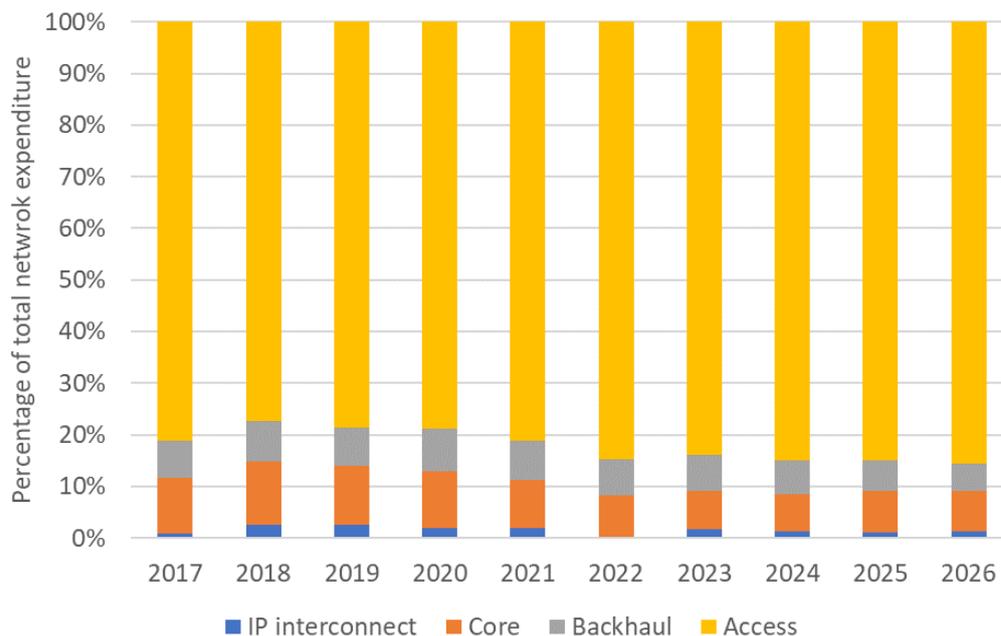
⁴⁰⁰ [TalkTalk response](#) to the 2022 Consultation, p. 5; [Three response](#) to the 2022 Consultation, p. 36.

⁴⁰¹ [Amazon response](#) to the 2022 Consultation, p. 2-4; [The BBC response](#) to the 2022 Consultation, p. 6; [Google response](#) to the 2022 Consultation, p. 5; [Meta response](#) to the 2022 Consultation, p. 4; [Netflix response](#) to the 2022 Consultation p. 1; [Sky response](#) to the 2022 Consultation, p. 1.

Evidence relating to the magnitude of network costs that vary with the level of traffic

- 11.26 For fixed ISPs, the backhaul and core network are the parts of the network that contain the most traffic-sensitive costs.⁴⁰² Backhaul is the network that connects an ISP’s access network to its core network and the core network comprises high-capacity links used to move traffic over large geographic distances. Figure 11.1 shows that backhaul and core costs have typically made up about 20% of total network costs (although the data provided to us by ISPs as summarised in Figure 11.1 show that this proportion is forecast to decline in the years up to 2026).⁴⁰³ The majority of the network costs relate to the access network. These costs are generally invariant to traffic, being driven more by the number of customers that can be connected to the network and the technology used.
- 11.27 The UK’s fixed access network is being upgraded by a wide range of providers to be able to offer gigabit-capable broadband (i.e. broadband able to offer speeds of at least 1Gb/s). Currently, over 70% of premises are able to access a gigabit-capable network.⁴⁰⁴ The Government has an ambition for this to increase to 85% by 2025, and over 99% by 2030.⁴⁰⁵ These network rollouts are expected to provide sufficient capacity to meet increases in peak traffic well into the future without the need for further investment (and the capacity can be upgraded by updates to the existing network rather than deploying new networks).

Figure 11.1: Percentage of network costs for each layer of a typical fixed network



Source: Ofcom analysis based on RFI responses from [3].

⁴⁰² We consider access network costs to be relatively independent of traffic in the short to medium term (see para 11.26), although in the long term, there might need to be further investment in access networks.

⁴⁰³ IP interconnect costs can also be affected by peak demand but are a very small percentage of costs.

⁴⁰⁴ Ofcom, [Connected Nations: Spring 2023 update](#) p. 1.

⁴⁰⁵ Ofcom, [Connected Nations: Spring 2023 update](#) p. 4.

- 11.28 Information obtained from ISPs suggest that fixed backhaul and core network costs are likely to amount to approximately £60 a year per user.⁴⁰⁶ 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. The information we have suggests that for fixed networks between 50-75% of both backhaul and core fixed network costs are likely to be dependent on the level of traffic at peak times.⁴⁰⁷ Using this estimate, these peak traffic-dependent costs would represent approximately £30-45 per customer per year.
- 11.29 For mobile networks, we consider all of the network costs, including the access network, are traffic-sensitive to a certain extent.⁴⁰⁸ This is because with the exception of a small number of components (such as location registers), mobile access networks tend to scale in size with the amount of traffic carried (with key aspects of costs such as infrastructure and spectrum being related to the volume of traffic carried).⁴⁰⁹ Information obtained from mobile networks suggests that the total network costs per subscriber are around £40 a year on average.⁴¹⁰ The information we have suggests that around 50-75% of these total mobile network costs are likely to vary with the level of traffic at peak times.⁴¹¹ Using this estimate, these peak traffic-dependent costs would represent approximately £20-30 per mobile customer per year.
- 11.30 ISPs also provided information that shows the majority of the traffic on their networks comes from a relatively small number of large content providers. As set out in paragraph 3.44, the data indicates that a large portion of busy hour traffic (in the region of 50%) on fixed ISPs' networks is driven by five large content providers, specifically, Amazon, Facebook, Google, Netflix and Sky. Further, two CDNs, Akamai and Edgio, also contribute a material proportion of traffic throughput in the busy hour.⁴¹² As such, there may be content providers who use these (and other third party) CDNs as their main means to distribute traffic who will not be identified as large providers, [redacted], or, to the extent that they use CDNs, the proportion of traffic assigned to the large five content providers identified above, may be understated.

⁴⁰⁶ This estimate is calculated by looking at historical and forecast opex and capex provided by suppliers across the backhaul and core network over 10 years (2017-2026). This has then been divided by the number of current subscribers.

⁴⁰⁷ We have estimated this using data from [redacted], and Frontier, 2022, [Estimating OTT traffic-related costs on European telecommunications networks, a report by Frontier for Deutsche Telekom, Orange, Telefonica and Vodafone](#), pp. 6-7.

⁴⁰⁸ This approach is consistent with the approach taken in Frontier, 2022, [Estimating OTT traffic-related costs on European telecommunications networks, a report by Frontier for Deutsche Telekom, Orange, Telefonica and Vodafone](#), pp. 6-7.

⁴⁰⁹ See for example Frontier, 2022, [Estimating OTT traffic-related costs on European telecommunications networks, a report by Frontier for Deutsche Telekom, Orange, Telefonica and Vodafone](#), pp. 6-7.

⁴¹⁰ This estimate is calculated by looking at historical and forecast opex and capex provided by suppliers across their mobile network over 10 years (2017-2026). This has then been divided by the number of current subscribers.

⁴¹¹ We have estimated this using data from [redacted], and Frontier, 2022, [Estimating OTT traffic-related costs on European telecommunications networks, a report by Frontier for Deutsche Telekom, Orange, Telefonica and Vodafone](#), pp. 6-7.

⁴¹² The two CDNs contribute in the region of [redacted]%

Evidence relating to the extent to which content providers can affect the costs and efficiency of ISPs' networks

11.31 As noted above, some ISPs have argued that large content providers 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. We understand that this argument relates to two potential justifications for a charging regime:

- Firstly, where a content provider'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.
- Secondly, there are various externalities present in the use of ISPs' networks. For example, one retail customer's use of the network at the peak can increase the risk of reduced network performance and worsen the quality of experience for other customers of the network. The way in which the content provider chooses to deliver that traffic at the peak can have the same impact. The implication of these externalities is that they can lead to inefficiencies if content providers 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 it were to incentivise content providers to minimise the impact they have on ISPs' network costs.

11.32 The strength of the above arguments depends on whether and to what extent a content provider can affect the costs an ISP incurs and hence, the efficiency of an ISP's network. In principle, we understand a content provider 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 drive an ISP to increase its network capacity to ensure such traffic can be delivered; shifting less time-sensitive traffic to off-peak hours can reduce an ISP's network costs and improve its efficiency); and / or
- deciding on how its traffic is delivered and where traffic is handed over to the 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).

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

Determining the timing of traffic

11.34 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 content provider 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.

11.35 The data suggests that the majority of top traffic peaks on the network have been driven either by a live football match or a major gaming update. These two types of traffic have different characteristics:

- Content providers are unlikely to have much ability to influence the timing of traffic with regards to live events as this is generally determined by event organisers. In addition, this traffic needs to be delivered with relatively low and consistent latency to the end user, otherwise the experience is degraded (for example, the picture may become jerky or break up). While this can be managed by the content provider by buffering content when it arrives to allow smooth playback, content cannot be buffered too long for a live event.⁴¹³
- Gaming downloads relate to downloading new games, new versions of games, and patches or updates. These can be very large files, sometimes over 50GB. Downloading these files needs to be completed before the user can play the game. This means downloading quickly on request may be important to the end user, but they can in principle be scheduled outside peak hours. Further, it does not have exacting latency requirements, as long as the whole file is ultimately delivered, and so can be managed by ISPs differently to livestreaming if there is congestion on the network.

11.36 In relation to live streaming, particularly of live sports, as set out at paragraph A3.14 of Annex 3, ISPs identified football matches as a significant source of traffic contributing to the network load, contributing to 83% of the top 10 peaks experienced on ISPs' networks over the period 2019-2022 (where a specific driver could be identified).⁴¹⁴

11.37 While content providers cannot shift this traffic, and it needs to be delivered with low latency, content providers have worked with ISPs to help plan live sporting events. These preparations include more detailed demand forecasts, operational support during the event, test events and a breakdown of CDN delivery partners. In the run up to the 2022 World Cup, content providers (or their CDNs) met with ISPs for planning purposes.

11.38 In relation to gaming, as gaming downloads are not as sensitive to the quality of service with which they are delivered, the incentives of gaming companies to ensure efficient traffic delivery on any given ISP's network will be weaker than the incentives of content providers offering live video streaming. The information obtained from ISPs suggested that gaming updates have contributed to a number of traffic peaks in the past (24% of the top ten peaks over the period 2019-2022 where a specific driver could be identified involved a gaming update).

11.39 ISPs also argue that gaming companies, when they do release content at peak times, do not consistently provide much (or any) advance notice to ISPs ahead of these major updates. A traffic peak on the 15 February 2023 was a notable example, whereby the gaming company releasing a significant download did not give much, or any, notice to ISPs.⁴¹⁵ We note that gaming companies may make their schedules for future updates public (although as we recognise below, this information may be insufficient for ISP planning purposes, as typically the ISP will need to know the size of the corresponding traffic and how it is planned to be delivered).

11.40 We understand that it is the gaming companies that ultimately decide when to launch new games, and their approach to delivering downloads and updates related to this. In our view:

⁴¹³ Content can be buffered for longer for video on demand since this is not real-time content.

⁴¹⁴ 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. We note that the proportion of peaks relating to football is similar regardless whether or not the 2022 World Cup is included.

⁴¹⁵ [redacted].

- In relation to notifying ISPs, in many cases content providers may not have direct relationships with all ISPs. Therefore, we would expect content providers to notify the CDNs they use to deliver traffic of upcoming releases wherever possible to allow for proper co-ordination. ISPs may be able to identify the dates of major releases from monitoring publicly available information on gaming websites, but this is unlikely to identify the scale of the expected traffic to be delivered.⁴¹⁶ It may be more difficult to identify patch releases this way.
- Certain gaming companies have increased the degree to which they shift updates and enable download of new titles to off peak hours since 2020.⁴¹⁷ They have suggested they have made decisions to shift traffic out of busy periods where possible to try and minimise the impact of downloads on ISP networks^{418, 419} and in some cases have been engaging with ISPs in advance of certain major downloads.⁴²⁰ Shifting traffic out of the peak may also reduce charges from CDNs to deliver updates, though this is unclear as charges may be based on total, not peak traffic, and may be based on global, not UK-specific traffic delivery. Nonetheless, shifting updates does not appear to happen across gaming companies or on a consistent basis.
- New games are often launched on a global basis, and games may have “seasons”, so that an existing game may get a series of updates for the start of a new season, and then progressive updates throughout the season. Game developers are likely to set the time for new games or seasons to start based on aligning with when their developers and technical support staff are available to monitor initial play. Where an end user initiates a download rather than the company seeking to pre-download, the timing of delivery of this traffic would be determined by the end-user, not the gaming company.

11.41 As such, while in principle gaming traffic may be time-shifted to some extent as has already been done in some cases, there may be some limitations on how flexible this can be.⁴²¹ However, regardless of the extent to which constraints exist on the ability to time-shift gaming traffic, the incentives of gaming companies to ensure efficient traffic delivery on any given ISP’s network will be weaker than the incentives of content providers offering high quality live video streaming, providing some potential justification for a charging regime.

11.42 As many content providers may have limited ability to directly determine the timing of traffic, we now consider a broader question of whether and if so, to what extent those

⁴¹⁶ The traffic to be delivered will depend on the size of the file, the number of end users downloading the file who are customers of the ISP and how many of these are concurrent.

⁴¹⁷ [redacted].

⁴¹⁸ For example, [redacted].

⁴¹⁹ Even though game releases may be released at off-peak times, they can contribute to peak demand as downloads can often be started at any time by the user and potentially can take several hours depending on the speed of the connection.

⁴²⁰ For example, [redacted].

⁴²¹ In addition to gaming downloads, video content may also be automatically downloaded (although the proportion of video streaming content that is automatically downloaded is currently very low). Generally, content providers told us that video content was downloaded after a request initiated by the user (see for example, [redacted]). However, in some circumstances content providers give the user the opportunity to download content automatically. For example, both Amazon Prime and Netflix have an option to automatically download the next episode of a series for offline viewing (Amazon response to information request received 31 May 2023 and Netflix response to information request received 17 May 2023).

content providers may be able to indirectly influence the timing of their customers' requests to access content and services (e.g. through pricing).

- 11.43 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 content providers indicated that customers are strongly opposed to restrictions around when they can access content and services, so the potential ability of content providers to influence the timing of this traffic without losing customers is uncertain.⁴²² This however may result in some degree of inefficient network use, particularly at peak hours, where certain customers might 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 (with content providers noting that ISPs do not structure their tariffs to encourage customers to use lower quality services or services at off-peak times).^{423 424} We consider that as ISPs are able to influence all traffic on their networks (whereas content providers can only influence the actions of their own users), ISPs are likely to be better placed than content providers to influence the timing of customer usage.

Choosing an efficient delivery approach

- 11.44 Even where the timing of traffic is generally decided by the ISP's retail customer, a content provider can in principle affect how and where that traffic is delivered to the retail ISP's network. That content provider's choice can therefore also influence ISPs' network costs and their efficiency.
- 11.45 Content providers, and particularly large content providers, can and do take actions to reduce the impact on ISPs' networks by using services (such as CDNs) or making investments which tend to improve the efficiency of traffic delivery. These actions include the following:
- Content providers reach agreements with ISPs in terms of where traffic is handed over to the ISPs' network. The evidence suggests that some content providers (including both video streaming content providers and gaming content providers) reach agreements with ISPs and then use, or invest in, CDNs to handover traffic closer to the user which tends to reduce traffic, including at peak times, that needs to be delivered through ISPs' core networks.⁴²⁵ In the run up to the 2022 World Cup, content providers reviewed their approach with ISPs, including adding new CDNs to deliver traffic. Based on forecasts from the content providers these CDN providers then attempted to agree with the ISPs the best way to manage the additional traffic.⁴²⁶ ISPs submitted that in such negotiations there could be differences between ISPs and content providers in relation to the use, or choice, of CDNs which required resolution.⁴²⁷ CDNs can also help improve efficiency because they concentrate large

⁴²² [redacted].

⁴²³ 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 network congestion which can often occur during peaks).

⁴²⁴ See for example [ITV](#) response to the 2022 Consultation, p. 1.

⁴²⁵ [redacted]. In its response to the 2021 Call for Evidence, [Netflix](#) referenced a study by BT Group 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) and [redacted].

⁴²⁶ [redacted].

⁴²⁷ [redacted] and [redacted].

volumes of traffic from multiple content providers into single arrangements with each ISP.

- Content providers can invest in the development and deployment of infrastructure to help reduce ISPs' costs. For example, Microsoft, Meta and Google are investing in subsea cables to allow them to deliver content closer to the end user on their own networks rather than via other providers' networks.⁴²⁸
- Finally, content providers also invest in technology solutions (e.g. video encoding, adaptive bit rate delivery) which help reduce ISPs' costs and reduce the traffic volume required to deliver their content.⁴²⁹ Google referred to the design and investment in products and services that minimise traffic load. It noted that it works with ISPs to bring its content closer to their consumers, for example by optimising YouTube videos to make sure they fit within a user's bandwidth and device capabilities.⁴³⁰ Some content providers also suggested that they have made significant investments in codec and adaptive bit rate technology, that enables traffic to be delivered more efficiently.⁴³¹ Netflix referred to its ongoing investment in streaming efficiency (local caching, and investment in codec technology which has halved the amount of bits needed to carry a film or series of the same video quality)⁴³² and its participation in the Alliance for Open Media which contributes to the development of advanced video encoding technology.⁴³³ Similarly, Amazon referred to its actions that minimise disruption and peaks to network demand, for example, through using its own CDN and adaptive bit rate technology; and allowing game downloads in advance of their actual launch.⁴³⁴
- The UK based investments in infrastructure and technology solutions made by each large content provider can vary significantly but they tend to have an order of magnitude of about £[redacted]m to [redacted]m per year.⁴³⁵

11.46 Information obtained from content providers suggested that they face a number of barriers, that are not within their control, to further improve the efficiency of their approach to traffic delivery. Some of these barriers identified by content providers include:

- some potentially more efficient technological options (e.g. multicasting) are not yet practical or technologically feasible for content providers at all, or for ISPs;⁴³⁶

⁴²⁸ See for example, Google, 2021, [All about cables: A guide to posts on our infrastructure under the sea](#) [accessed 2 October 2023].

⁴²⁹ Netflix, BBC and ITV all mentioned 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.

⁴³⁰ [Google response](#) to the 2022 Consultation, p. 6.

⁴³¹ [The BBC response](#) to the 2021 Call for Evidence, para. 17; [ITV Response](#) to the 2021 Call for Evidence, pp. 2-3. Meetings with [redacted].

⁴³² Netflix response dated 15 May April 2022 to the RFI dated 17 March 2022, p. 5.

⁴³³ [Netflix response](#) to the 2022 Consultation, p. 2.

⁴³⁴ [Amazon response](#) to the 2022 Consultation, p. 3.

⁴³⁵ [redacted].

⁴³⁶ 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 content providers. 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.

- 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;⁴³⁷ and
- limited options to use CDNs when specific features are required (e.g. geoblocking).⁴³⁸

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

Our assessment

11.48 First, we accept the argument that content providers 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. We consider that the evidence above suggests that:

- In many cases (particularly for live events) the extent to which content providers determine the timing of traffic, and hence cause the peaks in traffic and the associated ISPs' network costs, is limited. However, in other cases we have received evidence of instances where gaming companies have not provided much (or any) advance notice to ISPs ahead of large updates for popular titles (see paragraph 11.39).⁴³⁹ This indicates that there may be some scope for certain types of content provider (in particular, those offering downloads that are less time sensitive) to time traffic delivery more efficiently in particular circumstances.
- Many content providers, including many of the largest content providers (which account for a significant share of traffic), are already making decisions and investments that tend to improve the efficiency of traffic delivery. These content providers appear to be making these investments in order to improve the quality of experience for their customers. In principle, under a charging regime, content providers could have stronger incentives to improve the efficiency of how their traffic is delivered over ISP networks, and this might be particularly relevant for content providers whose customers are less sensitive to traffic quality (or for CDNs/others in the value chain who may have weaker incentives than the content providers themselves). However, we are also aware that there are likely to be constraints on the ability of some content providers to make further efficiency improvements (where other types of inefficient use of networks has been raised by ISPs, there are also indications that this might sometimes be driven by content providers' inability to access more efficient traffic delivery means e.g. a more

⁴³⁷ See for example, [X].

⁴³⁸ An ISP, [X], outlined how some content providers, 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 [X] on 21 June 2022.

⁴³⁹ We have also considered the automatic downloading of video content but consider this is unlikely to be a major contributor to congestion at this time given that (a) the proportion of video content automatically downloaded is currently very low; (b) we do not have evidence that the timing of such downloads occurs predominately at peak times; and, (c) such downloads do not tend to occur by default (consumers tend to have to opt-in to enable this).

extensive use of CDNs or appropriate multicasting technology and infrastructure), as opposed to a lack of incentive or willingness to do so.

11.49 We also consider that our updated guidance in this review is expected to have a positive impact on ISPs' ability to manage their networks more efficiently and recover costs. We are providing 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 approach creates scope for ISPs to manage traffic according to category of traffic. Under such an approach traffic such as gaming downloads, which are less sensitive to latency than services such as livestreaming, could be assigned a different priority so that in busy periods it may take longer to download. This would give a ISPs greater ability to manage their networks more efficiently and to mitigate the potentially harmful effects of unexpected increases in download traffic during periods of peak demand.
- We also note that some of the inefficiencies of network use might arise because of retail customer behaviour, as discussed above. Our approach on retail offer differentiation allows ISPs to offer packages that encourage their retail customers to more explicitly consider what quality of experience they want. Some customers may opt to pay a premium for a higher quality of experience, whereas others might prefer to pay a lower price, particularly if they do not require time- or quality-sensitive content (or can shift some of their quality-sensitive usage to off peak hours). Encouraging customers to consider their usage might effectively reduce congestion and lower demand on the network. 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 approach in relation to specialised services aims to make it easier for ISPs to deploy innovative new services and generate new revenue sources.

Transfers and distributional impacts of a charging regime

11.50 We next consider the transfers that could result from a charging regime. These transfers would involve payments from content providers to ISPs, which could affect the prices that ISPs and content providers charge their retail customers, with any overall change on consumer welfare depending on the balance of these transfers.

Stakeholder responses

11.51 In response to our 2022 Consultation:

- ISPs noted that as the net neutrality rules have prevented charging on one-side of the market, being able to charge both consumers and content providers could lead to lower retail prices; and⁴⁴⁰

⁴⁴⁰ [BT Group response](#) to the 2022 Consultation, p. 3; [Institution of Engineering and Technology response](#) to the 2022 Consultation, p. 2; [Three response](#) to the 2022 Consultation, p. 31; [Vodafone response](#) to the 2022 Consultation, p. 4; [Virgin Media O2 response](#) to the 2022 Consultation, p. 9.

- content providers argued that the effect of introducing a charging regime could lead to lower levels of investment or higher prices for content subscriptions.⁴⁴¹

11.52 The economic concepts and current debate relating to issues around transfers are explained in further detail in Annex 4. This section sets out our view as to the circumstances under which these transfers may be welfare enhancing and our view as to whether these circumstances hold or are unclear in the UK context, and depend on the design of a charging regime.

Our assessment

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

11.54 First of all, if a charging mechanism encouraged content providers to use ISPs' networks more efficiently, and this resulted in lower network costs, at least some of these cost reductions could be passed through to retail broadband customers in lower prices. The greater the magnitude of any cost savings passed through to customers, all else equal, the less they would be available to fund network investments, a potential aim of any charging regime. 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. The costs of fixed networks that are traffic dependent and relate to traffic peaks equate to around £30-£45 per user per year and on mobile networks equate to around £20-£30 per user per year, so any improvements in efficient traffic delivery would likely be limited to these values as an upper bound (in practice we would expect any efficiencies and consequent savings to represent a proportion of these costs).

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

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

11.56 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:⁴⁴²

- The **intensity of competition in retail broadband markets**. The higher this is, the higher either the expected reduction in retail broadband prices and/or the expected increase in investment (the balance of which will depend on the extent to which customers value lower prices or improved network quality). The lower this is, the more likely any charges may be taken as profits.

⁴⁴¹ [ITV response](#) to the 2022 Consultation, p. 3; [The BBC response](#) to the 2022 Consultation, p. 7.

⁴⁴² A charging regime can also have long term impacts, such as an impact on content providers' ability to compete and innovate in content, and that impact will depend to a degree on the design of a regulatory regime.

- The **intensity of competition in the markets for content provider services**. In highly competitive content markets, price changes are likely to be closely reflective of cost changes, particularly where additional charges apply to all or a significant proportion of content providers; whereas in less competitive markets, some content providers may be able to absorb some of the cost increases in their margins.
- The **content provider business model**. Where customers are accessing ad-funded content, as opposed to subscription-funded content, the mechanism for pass-through of charges from a content provider to those customers is less clear, and some or all of the charges may be borne by the content provider,⁴⁴³ while certain content providers such as the BBC may not have any scope to revise customer fees where they need to pay charges to ISPs.⁴⁴⁴
- The **magnitude of any charges imposed** and whether a charge is cost-based or also includes a mark-up above costs.
- The **structure of any charges imposed** (a per volume charge will likely have a greater cost pass-through than a fixed lump sum fee).

11.57 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 content providers); the content providers 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 content providers that are charged are largely ad-funded.⁴⁴⁵

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

11.59 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.

Impact on network investments of a charging regime

11.60 We next consider the impact on investment of a charging regime.

Stakeholder responses

11.61 In response to our 2022 Consultation:

⁴⁴³ See, for example, Greenstein S, Peitz M & Valletti, T, 2016. [Net Neutrality: A Fast Lane to Understanding the Trade-Offs](#).

⁴⁴⁴ We note that any charges imposed on content providers would likely increase as the shift to viewing content online continues (if charges are levied on a per-unit basis). PSBs and other content providers who do not charge a subscription fee may therefore in the future face significant charges under any regime and respond to these charges by investing less in content.

⁴⁴⁵ The impact of a charging regime on ad-funded content providers is discussed in a paper by Bruno Jullien and Matthieu Bouvard and discussed further in Annex 4.

- ISPs argued that increasing demands on networks mean that investment will need to be increased. In particular, they noted increasing demands on networks may include the switch from DTT, as well as the proliferation of connected devices;⁴⁴⁶
- however, Sky, which is also an ISP, noted that ISPs have continued to invest in increasing network capacity, and that unit costs of capacity have continued to fall as a result of steady and regular efficiency improvements;⁴⁴⁷
- content providers questioned the submissions from ISPs, noting that internet traffic has continued to grow without networks costs growing at a proportionate rate; and⁴⁴⁸
- content providers also noted that it is unclear whether the proceeds of any charging regime would be invested in networks, or whether these proceeds would go to lowering retail broadband prices or go to ISP shareholders.⁴⁴⁹

11.62 The economic concepts and current debate relating to issues around investments are explained in further detail in Annex 4. This section sets out our current view as to whether charging would lead to increased investment in networks.

Evidence relating to network cost recovery and impact on future investment

11.63 The evidence does not appear to suggest there are significant concerns with future investment overall, at least for the next few years:⁴⁵⁰

- As outlined in Annex 3 in Figure A3.7, [redacted], most major fixed ISPs are forecasting a similar level of nominal expenditure over the period 2022-2026 compared to the period 2017-2022. Figure A3.8 suggests that mobile networks are forecasting relatively consistent levels of investment. We recognise that relatively stable levels of nominal investment in an environment of rising costs will imply falling real investment (although as noted below, we do not consider that we have sufficient evidence of significant concerns in relation to levels of investment, nor that a charging regime is necessarily the best means to remedy any such concern).
- One ISP [redacted] suggested to us that there will be an ‘investment gap’ due to a significant [redacted] increase in demand by 2030 and a slowing in the rate of future cost decreases (such that unit costs are not decreasing as fast as demand is increasing).⁴⁵¹ We note that such an increase in demand has been seen previously without increasing costs due to decreasing unit costs of equipment.⁴⁵² [redacted], and we note this ISP provided limited evidence to support their projections in relation to the path of future costs

⁴⁴⁶ [BT Group response](#) to the 2022 Consultation, p. 2; [Institution of Engineering and Technology response](#) to the 2022 Consultation, p. 1; [Three response](#) to the 2022 Consultation, p. 37.

⁴⁴⁷ [Sky response](#) to the 2022 Consultation, p. 1.

⁴⁴⁸ [The BBC response](#) to the 2022 Consultation, p. 6; [Netflix response](#) to the 2022 Consultation, p. 2; [ITV response](#) to the 2022 Consultation, p. 1.

⁴⁴⁹ [The BBC response](#) to the 2022 Consultation, p. 7; [ITV response](#) to the 2022 Consultation, p. 1.

⁴⁵⁰ 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.

⁴⁵¹ Ofcom meeting with [redacted] on 21 June 2022.

⁴⁵² Unit costs here refer to costs of equipment per unit of traffic.

(with later years being an extrapolation and recognition that there may be further opportunities to reduce future costs).⁴⁵³

- 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.
- We note that BEREC, when responding to the European Commission’s exploratory consultation on the future of the telecom sector, found no evidence that ISPs in EU member states were unable to fully cover their costs.⁴⁵⁴

Our assessment

11.64 Based on the evidence above, we are not persuaded by the arguments made by ISPs in response to our 2022 Consultation that the current net neutrality regime undermines their ability to recover future investment costs to meet expected traffic growth.

11.65 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 (for example, due to a possible switch-off of Digital Terrestrial Television), 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, as well as the costs of borrowing (which we recognise has been increasing). Historically, unit cost decreases have enabled ISP networks to keep broadly consistent levels of expenditure over time despite significant increases in overall traffic demand.⁴⁵⁵ Further developments such as multicasting may further reduce the bandwidth demands of certain services, meaning that unit costs are likely to continue to decrease, but we accept that the level and the rate of further reductions is uncertain.⁴⁵⁶

11.66 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). Our policies set out in this statement will help support this.

11.67 Even if it were to be the case that there were concerns in relation to the level of future investment, we make the following observations:

- In general, 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.⁴⁵⁷ In a competitive market we would expect that where ISPs provide services that users want, these

⁴⁵³ [X] Response to RFI of 31 May 2023, Q15.

⁴⁵⁴ BEREC, [BEREC’s Response to the Exploratory Consultation](#), p. 11, 19 May 2023.

⁴⁵⁵ 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.

⁴⁵⁶ Unit costs may fall at a slower rate compared to previously, if, for example, costs do not continue to fall at the same rate as previously, or they may fall at a faster rate due to the deployment of new technologies which allow for higher volumes of traffic to be delivered.

⁴⁵⁷ See for example Ofcom, 2021 [WFTMR 2021-26](#), Volume 1 para. 2.24-2.28; and Ofcom, 2022, [Ofcom’s future approach to mobile markets: a discussion paper](#), paras 4.11- 4.16; 4.55- 4.59, and 4.73.

ISPs should be able to charge prices to customers to cover their costs. As such, we note that the arguments described in paragraph 11.63 that there is an ‘investment gap’ do not take into account the ability for ISPs to increase prices to fund investments valued by customers, should this be required.

- Further, increasing investment needs do not imply that charging is the optimal way to fund any such investment. ISPs are large organisations and the investment required is likely to be a small proportion of an ISP’s total revenue.⁴⁵⁸ As such, in addition to the possibility of increasing prices, ISPs are likely to have other alternative ways to fund network investments, such as through raising funds from shareholders.

11.68 Finally, we also consider that our decisions in this Statement relating to traffic management, as set out in Section 6, will enable ISPs to more effectively manage traffic peaks on their networks. This may reduce the need to make investments in network capacity to meet increasing traffic peaks.

Practical challenges and risks of unintended consequences of a charging regime

11.69 Finally, we consider the practical challenges and potential unintended consequences of a charging regime.

Stakeholder responses

11.70 Stakeholders have suggested that commercial negotiations should be the focus of any charging regime. Three and Virgin Media O2 have proposed a model of commercial negotiation, whereby (large) content providers have to negotiate with ISPs. This would likely be accompanied by a regulatory backstop in the event that terms cannot be negotiated.⁴⁵⁹ Such a regime is similar to the one proposed by the GSMA and ETNO in which there is an obligation for content providers and ISPs to negotiate (limited to ‘large traffic generators’), and an arbitration mechanism if negotiations do not work.⁴⁶⁰

Practical challenges

11.71 There are practical challenges to implementing a charging regime in an effective way. We do not speculate on how a future charging regime could be implemented through legislation, but note that there are a number of possibilities in how a charging regime could be designed, both in terms of the basis for such charges (e.g. a content provider 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). The nature of any such regime would differ depending on the objectives that it is aiming to meet. If the aim of the regime is to create better incentives for efficient network use, to be effective it would need to influence the behaviours of the content providers that generate the most traffic (for example, through a per-unit charge), while if the regime were aiming to address congestion,

⁴⁵⁸ For example, the level of annual investment identified as required by [3<] accounts for around [3<]% of its annual revenues (Ofcom calculation).

⁴⁵⁹ [Three response](#) to the 2022 Consultation, p. 40; [Virgin Media O2 response](#) to the 2022 Consultation, p. 26.

⁴⁶⁰ GSMA and ETNO, 2023, [Summary of the Joint Telecom Industry Response to the EU consultation on “The future of the electronic communications sector and its infrastructure,”](#) p. 8.

a peak-based charge could shift non-time sensitive traffic to off-peak hours. If the purpose of the regime was to fund investment in networks, to be effective it would need to ensure that funds raised through the charges are reinvested in the network (and not competed away in lower retail prices or paid to ISP shareholders).

- 11.72 While it may be possible to charge content providers where they are directly interconnected with ISPs, charging all or specific content providers for traffic delivered by other means may be more complex. Traffic would have to be identified with a high degree of precision in order to correctly charge the content providers generating the traffic and avoid disputes (which could be costly to resolve). The charging and billing for (potentially) a very large number of content providers would also generate new costs (such as implementing billing processes and systems where they do not currently exist).

Potential unintended consequences

- 11.73 In principle, a more permissive approach on charging, particularly if it creates the possibility of blocking, throttling or degradation of services,⁴⁶¹ 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 content providers. 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 content providers. As discussed in some economic literature, ISPs may be incentivised to make as many content providers as possible pay for prioritised traffic, assuming ISPs cannot generate any revenue from content providers whose traffic is not prioritised. In these circumstances, ISPs may choose to artificially reduce the quality of internet access services for non-prioritised traffic if this forces more content providers to agree to pay ISPs for prioritisation. Depending on the 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'.⁴⁶²
- 11.74 On the other hand, a charging regime targeted at larger content providers only may have detrimental effects on larger content providers and distort competition between larger and smaller content providers, increasing larger content providers' costs and reducing the incentives for smaller content providers to grow.

The potential need for regulatory involvement

- 11.75 IP interconnection and co-location provide insight on how a charging regime might operate. IP interconnection and co-location fall outside of the net neutrality regulation and therefore ISPs are free to charge content providers. However, charging does not generally occur (i.e. it is 'settlement free') and where it does, the extent and level of payments can vary. As such,

⁴⁶¹ Removal or adjustment of the relevant sections of net neutrality rules, could in principle, potentially enable ISPs to extract payments from content providers, through offering traffic management on the basis of commercial considerations (e.g. prioritisation or otherwise enhancing the service offered to content providers), and credibly pledging to remove or degrade access absent payment. However, competition at the retail level could deter ISPs from such actions, particularly for 'must-have' content and services which can give the content providers a degree of bargaining power.

⁴⁶² 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.

we consider that net neutrality rules are likely not the only barrier to ISPs charging content providers for carrying traffic. We consider this may be for several reasons:

- ISPs explained that while they adopt settlement free interconnection, they may have on-net caching policies where large content providers or CDNs directly install caches into the ISP's network.⁴⁶³ Under these agreements, the content provider may provide, or contribute to covering the costs of the hardware and software within the caches or other costs relating to making connections with an ISP.⁴⁶⁴ In return, an ISP would provide space, power and cooling in the datacentre for the cache, often free of charge.^{465 466} These policies are adopted because it is mutually beneficial for the involved parties (e.g. offloading traffic from parts of the network for retail ISPs and ensuring better quality of service control for content providers).⁴⁶⁷ ISPs noted that if they sought to impose a fee it may encourage content providers to seek to deliver more traffic through less efficient routes (e.g. IP transit) and increase the risk of congestion on their networks.⁴⁶⁸
- Some ISPs acknowledged that they may have limited ability to impose interconnection fees on content providers. These ISPs suggested this is because some content providers have an important role in supplying content to the ISP's retail customers and as such the ISP would be in a weak position to impose charges on such content providers, who could refuse to pay.

11.76 Under a commercial charging regime, the negotiating differences described above are likely to continue to exist, such that ISPs may be able to charge some content providers, but not others (depending on the balance of negotiating power). ISPs have argued for a charging regime, with arbitration where terms cannot be reached. We consider that there is a high likelihood that either the ISP or the content provider would seek arbitration (depending on whichever is the weaker negotiating partner) and, that therefore such a charging regime may effectively involve substantial regulatory involvement.

11.77 Finally, a regulated charging regime could be challenging to deliver, considering the complexity and the dynamic nature of the commercial context. In particular:

- The setting of, or decision on, an appropriate charge would be complex and need to take into account the costs incurred by the ISP, how those costs should be apportioned between different network users, and how to deal with different time of day profiles from different content providers, etc. The regulatory cost of deciding on an appropriate charge, including any ongoing monitoring and review, plus dispute resolution may be material. These costs may offset any potential benefits from a charging regime.⁴⁶⁹
- Any charging regime is likely to need to be limited to a subset of large content providers (given the very high number of content providers). Thresholds could be

⁴⁶³ WIK-Consult, 2022. [Competitive conditions on transit and peering markets, final report](#), pp. 27-28.

⁴⁶⁴ For example, Netflix has invested in, and operates its own CDN, called 'Open Connect' which are deployed within ISP networks or at public internet exchange points (Netflix, [A cooperative approach to content delivery](#), 2021).

⁴⁶⁵ See, for example [redacted].

⁴⁶⁶ Where there are payments, they are related to hosting based on number of racks and port capacity, and a flat rate for power, to cover the associated costs. There may also be models based on revenue sharing.

⁴⁶⁷ [redacted], response to Q6, RFI dated 18 April 2023.

⁴⁶⁸ See [redacted] and [redacted].

⁴⁶⁹ See, for example, Oxera, 2023, [Proposals for a levy on online content application providers to fund network operators: An economic assessment prepared for the Dutch Ministry of Economic Affairs and Climate](#), p. 5.

based on various metrics, (for example, large content providers could be identified by number of users, turnover, or volume of traffic generated), however, it could be challenging to effectively identify a content provider that would be subject to the charge and an appropriate mechanism would need to put in place to check and monitor that the content providers subject to the charge are being correctly identified. It is also likely that the content providers subject to a charge would need regular revision given the continuously changing environment.

Our assessment

- 11.78 We note that there are a number of different arguments that have been made in support of a charging regime, and consider that the design of any regime would need to be clear in the objectives it is attempting to meet.
- 11.79 When assessing the merits of a charging regime we consider that it is important to take into account 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. We consider that the discussion above highlights significant risks of being able to do so.

Our conclusions on the impact of ISPs charging content providers

- 11.80 The net neutrality regime means that ISPs are currently effectively unable to impose charges on content providers since there is no legal or regulatory obligation on content providers to negotiate with ISPs.
- 11.81 In relation to the likely impacts of ISPs charging content providers for carrying traffic to end-users we conclude that:
- In principle there could be benefits to a charging regime, in that content providers may have stronger incentives to make efficient decisions if the impact of their decisions were reflected in the charges they face. However, the extent to which content providers determine the timing of traffic, and the choice of delivery approach (and hence impact ISPs' network costs), can be limited. Further, many content providers, including many of the largest content providers (which account for a significant share of traffic), are already making decisions and investments that tend to improve the efficiency of traffic delivery.
 - 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.
 - There are several significant uncertainties in relation to the scale of future investment. Even if it were to be the case that there were concerns in relation to the level of future investment, such concerns do not necessarily imply that charging is the optimal way to fund any required investment.
 - In considering how such a regime would be implemented, we recognise the difficulties that designing an effective scheme raises, the risks and uncertainty such a change could create. We consider that any commercial regime with arbitration is likely to in effect be a regulated regime given the likelihood for

agreement based on differences in negotiating power between ISPs and content providers.

- 11.82 A charging regime would be a significant step and we have not seen sufficient evidence that such an approach would support our objectives. We also consider our approach outlined in this document provides flexibility for ISPs in offering new services and managing traffic on their network, which should help mitigate several issues (in particular, the efficient delivery of traffic) identified by ISPs. We note that whether or not a charging regime should be introduced in the UK is a decision for Government and Parliament.

12. Our approach to monitoring the net neutrality framework

Introduction

- 12.1 In this section we set out our analysis and conclusions on our approach to monitoring.
- 12.2 In summary, we will gather data on general network performance and utilisation to monitor the overall provision of internet access services, and information on traffic management policies of internet service providers (ISPs). We will also gather data on zero-rating offers, differentiated retail offers and specialised services where these are provided. We intend to gather this data at least annually. We may also gather additional data where we are concerned an ISP may not be complying with the net neutrality rules.
- 12.3 Our new guidance setting out our updated approach is in Annex 1.
- 12.4 This section is structured as follows:
- firstly, we outline our proposals relating to our approach to monitoring that were set out in our 2022 Consultation and summarise stakeholder responses to those proposals;
 - we then provide our analysis (including our response to stakeholder comments) and conclusions, setting out our approach to monitoring.

Our 2022 Consultation

- 12.5 In the 2022 Consultation we set out our approach to monitoring. In particular, we set out the data we planned to gather to monitor compliance as follows:
- **Zero-rating:** we indicated we would gather information to monitor compliance, and that ISPs should be able to provide information on their offers against the Type One, Type Two and Type Three criteria.
 - **Differentiated retail offers:** we said ISPs should be able to provide information on request showing that different levels of services provided in each internet access service applied independently of the content accessed, information demonstrating compliance with the ISP's transparency obligations under Article 4, and information in relation to any traffic management measures employed to provide differentiated retail offers.
 - **Traffic management:** we said ISPs should be able to provide information on request detailing their use of traffic management, including, for each instance where traffic management is deployed, the parts of the network impacted, the information used to determine there was congestion or impending congestion, the dates and times traffic management was used, the specific measure used and how it complies with the Regulation and the impact of these measures on network performance. We also said we would gather data on traffic management measures deployed permanently to understand the effect these would have.
 - **Specialised services:** we said we would gather data on request showing how any specialised service launched by the ISP meets the criteria: (1) that optimisation is required; (2) that there is sufficient capacity available so that the specialised

service does not impact on general internet access services; and (3) that the service is not provided as a replacement for internet access.

- **General network performance:** we said we would gather data periodically in relation to general network performance, including traffic throughput, latency, jitter and packet loss, and other measures of congestion. We said we would be likely to gather this for various time periods such as the highest peak in each month, the average busy hour across the month and the average outside the busy hour.

12.6 Finally, we said we expected ISPs to retain the above information as follows:

- for specific offers such as zero-rating, differentiated retail offers and specialised services, for the period the offer is available and the following 18 months; and
- for traffic management actions, for 18 months after the end of the month in which a specific action was taken.

Stakeholder responses

12.7 In addition to raising specific points about our proposed approach to monitoring compliance, as discussed in the previous sections, a number of stakeholders made more general points about our proposed approach:

- BT Group, Virgin Media O2, Vodafone, KCOM, [redacted] and UKCTA were concerned that the proposed reporting would be overly burdensome on ISPs. They argued that as we are providing clarity on existing rules, it is disproportionate to increase reporting requirements on ISPs.⁴⁷⁰
- Sky, Meta, [redacted], [redacted] and Competitive Enterprise Institute agreed with our proposed approach to monitoring.⁴⁷¹
- Akamai and Amazon suggested public transparency should be required.⁴⁷²
- Ericsson, DCF, ISPA and techUK noted the importance of transparency, but also the need to ensure reporting and monitoring was proportionate both in terms of the impact on ISPs and Ofcom's resources.⁴⁷³
- [redacted] noted that reporting for specialised services may be complex due to the inability to distinguish between traffic streams on mobile networks.⁴⁷⁴

⁴⁷⁰ [BT Group response](#) to the 2022 Consultation, para. 16-17; [Virgin Media O2 response](#) to the 2022 Consultation, section 5; [Vodafone response](#) to the 2022 Consultation, response to questions 6, 9 and 12; [KCOM response](#) to the 2022 Consultation, para. 9; [redacted] response to the 2022 Consultation, para. 54- 57; [UKCTA response](#) to the 2022 Consultation, para. 10.

⁴⁷¹ [Sky response](#) to the 2022 Consultation, p. 1; [Meta response](#) to the 2022 Consultation, responses to questions 6 and 9; [redacted] response to the 2022 Consultation, responses to questions 6 and 9; [redacted] response to the 2022 Consultation, response to question 6; [Competitive Enterprise Institute response](#) to the 2022 Consultation, responses to questions 6, 9 and 12.

⁴⁷² [Akamai response](#) to the 2022 Consultation, responses to questions 9 and 11; [Amazon response](#) to 2022 Consultation, responses to questions 5, 9 and 12.

⁴⁷³ [Ericsson response](#) to the 2022 Consultation, response to question 6, 9 and 12; [DCF response](#) to the 2022 Consultation, responses to questions 6, 9 and 12; FCS response to the 2022 Consultation, response to question 6; [ISPA response](#) to the 2022 Consultation, responses to questions 6 and 9; [techUK response](#) to the 2022 Consultation, response to question 6.

⁴⁷⁴ [redacted] response to the 2022 Consultation, response to question 12.

Our analysis and conclusions

- 12.8 We disagree with ISPs' arguments that our guidance would obviate the need for additional monitoring. Our guidance is intended to provide clarity allowing ISPs to make greater use of traffic management and to launch innovative new services. We therefore need to adjust our approach to monitoring to ensure that we can continue to discharge our monitoring and enforcement duties under Article 5 of the Regulation. This imposes a duty on Ofcom to promote the continued availability of non-discriminatory internet access services at levels of quality that reflect advances in technology.⁴⁷⁵ 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. Finally, we are required to publish annual reports with the findings of our monitoring.⁴⁷⁶
- 12.9 To date, ISPs have not deployed traffic management techniques to a significant extent. Similarly, they have generally not offered retail services with different quality of service parameters (though we note some MNOs have offered services intended for use in fixed routers which are given a different priority to general mobile usage) and have not offered many specialised services. Several MNOs have zero-rating offers and, in some cases, we have gathered information on these to allow us to assess whether they were a cause for concern.
- 12.10 Where ISPs develop their approaches to zero-rating, retail offers, specialised services, and use of traffic management, they will not need to seek ex ante approval. But we need to ensure we can gather the data necessary to ensure ISPs are compliant with the rules.
- 12.11 We have considered the proportionality of our monitoring approach and consider the following approach will provide the data that is necessary for us to collect.

Regular data gathering

- 12.12 To support our monitoring, we will gather data from ISPs on a regular basis. This will include:
- general network performance;
 - relevant ISP policies, particularly in relation to the use of traffic management by the ISP;
 - information on the use of additional measures going beyond reasonable traffic management; and
 - information on the ISP's retail offers, zero-rating offers and specialised services.
- 12.13 We may, on a case-by-case basis, request further information where we have a particular concern in relation to an ISP's approach to meeting its obligations under the Regulation.
- 12.14 We do not expect ISPs to provide information to us except in response to our information requests. We set out more detail on the information that we expect ISPs to be able to provide on request from Ofcom.

General network performance

- 12.15 Data on general network performance will be important to allow us to assess the general quality of internet access services offered by ISPs. It will also provide a baseline against

⁴⁷⁵ Article 5(1) of the Regulation.

⁴⁷⁶ Article 5(1) of the Regulation.

which we can assess the impact of new retail offers and specialised services and the use of traffic management measures.

- 12.16 We expect to focus on measures of network utilisation, including the proportion of network elements experiencing a measure of congestion. We will gather:
- for mobile networks, information on the number and proportion of cell sites in an MNO's network that are congested; and
 - across mobile and fixed networks, information on the number and proportion of nodes and links in the backhaul, core and Interconnection networks that are congested.
- 12.17 We will agree with the ISPs the specific measures to gather, with the aim of gathering consistent data across ISPs. This will include the metric used by the ISP to consider a network element to be congested.
- 12.18 Where possible we will seek to use data collected for ISP's internal reporting of their general network performance.
- 12.19 We expect the data we collect will show the above information for each month. We will gather the data at least annually to support our annual monitoring report. We may gather the data more often if necessary but do not expect to gather data on a monthly basis (i.e. we expect our information requests will cover the data for a number of months, generally for a full year).

Traffic management policies

- 12.20 As explained in Section 6, ISPs may use traffic management in accordance with the Regulation. To enable us to monitor this, we will gather data on the ISPs' traffic management policy. We expect this to cover:
- details of the internet access services that the policy relates to;
 - what traffic management practices will be used and the particular circumstances where these practices would take effect;
 - where different traffic (or categories of traffic) is treated differently:
 - > description of the approach used to identify traffic;
 - > categories of traffic identified and an explanation of their technical characteristics;
 - > proportion of total traffic that is identified;
 - > reasons why traffic is not identified;
 - > how traffic that is not identified is treated;
 - > description of systems used to identify traffic including the approach to updates to improve accuracy of identification.
- 12.21 Where the ISP offers multiple internet access services, we expect to gather data on the different approaches taken for each service, and how each approach is used to deliver the contracted quality levels where these apply.
- 12.22 In general, we expect this information should be sufficient to allow us to monitor the use of reasonable traffic management, as explained in Section 6.
- 12.23 We would also expect ISPs to be able to provide information about how traffic management is used in order to provide parental controls and other content filters, block access to scams

or allow access to information for vulnerable consumers when access is otherwise blocked or suspended.

Use of additional traffic management measures

- 12.24 In addition, we will gather information on situations where additional traffic management has been applied as explained in Section 6.
- 12.25 We expect that additional traffic management measures to address congestion will be used on a relatively limited basis. However, given the potential impact on content providers and end-users, we expect ISPs to be able to provide information on request relating to each instance it is applied, including:
- the reason for using the additional traffic management measures;
 - the impact of the measures on traffic and network performance;
 - the specific traffic management measures that were applied and in which parts of the network;
 - the information used to determine that congestion was imminent or occurring; and
 - the dates and times when the traffic management measure was applied.
- 12.26 Where the information above (for example, in relation to the measures used or the approach taken to determine congestion was imminent or occurring) is in line with the traffic management policy, a reference to the policy is likely to be sufficient.
- 12.27 In the case of mobile access networks, where congestion may persist for longer periods, we would expect the ISP to provide data on its approach to managing traffic on the impacted cell site(s) in periods of congestion – we do not expect to gather data on each application of the additional measures unless we have specific concerns about the measure used or the impact of it.

Traffic management configured on a permanent basis

- 12.28 Where ISPs implement traffic management measures that are configured permanently on their networks, the ISP should be able to provide Ofcom with information to assess these measures. Where this is not sufficiently explained in the traffic management policies, further data we would expect to be available would be:
- What permanent measures have been implemented on their network, and which parts of the network are covered by each measure, explaining what traffic management practice is applied and the traffic to which this is applied.
 - The circumstances under which the measure is expected to impact traffic, and how these measures meet the relevant requirements.
 - The dates, times, duration and location on the network when this traffic management measure has impacted traffic.

Our approach to monitoring zero-rated offers

- 12.29 We will gather data on whether ISPs have launched zero-rating offers.
- 12.30 Where this is the case, as explained in Section 5, we will gather data regarding the content and applications being zero-rated, the requirements for new content providers to join the offer and the information that is provided to customers and content providers about the offer. This will allow us to check whether the offer is Type One or Type Two, in which case we do not expect to gather further data unless concerns are raised to us by content

providers or consumers. We expect this data will generally be readily available for ISPs as this data should be made publicly available to meet the ISP's transparency requirements.

- 12.31 We do not expect to regularly gather data that will allow us to assess Type Three offers. Where we consider it necessary to carry out an assessment of these offers, we will request the data on a case-by-case basis. We set out the data that we may collect for this assessment below.

Our approach to monitoring differentiated retail offers

- 12.32 We will gather data on whether ISPs have launched differentiated retail offers.
- 12.33 Where this is the case, as explained in Section 7, we will gather information demonstrating:
- the different levels of quality of service parameters for each retail offer, where relevant;
 - that the different levels of quality of service for different retail offers apply independently of the content, applications and online services accessed;
 - compliance with the requirements regarding services meeting the contracted level of quality of service;
 - the ISP has provided sufficient transparency of the different retail offers to consumers; and
 - information in relation to the application of traffic management measures, as set out above.

Our approach to monitoring specialised services

- 12.34 We will gather data on whether ISPs have launched specialised services. Where this is the case, as explained in Section 10 we will gather information demonstrating:
- Network performance data as explained above - these metrics will allow us to assess the general quality of internet access services being provided by ISPs, and will also provide a baseline against which we can assess the impact of specialised services; and
 - a summary of the content or applications to which the offer applies and the likely level of traffic, along with information on how the service is managed where this is not already set out in the information that we will gather about ISPs general traffic management policy.

Frequency of data gathering

- 12.35 We would expect to gather the above data annually, but may request it more frequently where it appears to us that ISPs are using traffic management measures or are launching or changing their offers on a regular basis.

Additional data gathering

- 12.36 In addition to the reporting set out above, we will gather data on a case-by-case basis where additional data is necessary, for example where we are concerned that an ISP may not be compliant with the Regulation or concerns are raised with us.
- 12.37 While we may request any data necessary to monitor compliance, we expect ISPs would be able to provide at least the following data:

- Traffic management – details of any use of traffic management outside the ISP's policy, and details of the impact of this traffic management on the network, including the impact on quality of service characteristics.
- Zero-rating – where ISPs launch zero-rating offers, we may gather information related to the characteristics of the offer, and the assessment undertaken by the ISP to ensure compliance, particularly in the case of offers that appear to meet the Type Three criteria. This may include the number of customers, customer data usage information, data usage associated with zero-rated content and information on engagement with content providers providing similar services that are not included in the offer.
- Differentiated retail offers – information to determine whether customers understand the offers, or to determine whether the approach may restrict access to certain content providers. This may include take-up or forecast take-up of different offers, information on complaints relating to specific offers and the impact of new services, such as increased congestion and the mitigating approaches being taken, where this is not clear from the general data collected on an ongoing basis as explained above.
- Specialised services – information about the ISP's assessment that a specialised service is needed (for example data on the ISP's assessment of the need for optimisation) and any further information about how network capacity is managed so that the specialised service does not negatively impact on internet access services.

Monitoring of the provision of internet access on transport and in public spaces

12.38 We would expect that ISPs providing services on transport and in public spaces would be able to provide information on request demonstrating how traffic management is applied on the service, where it is used and information on any capacity constraints applying to the service. This should also include where content is blocked, for example in relation to the Friendly WiFi scheme.

Retaining information

12.39 The information set out above may be used for Ofcom's general monitoring and annual reporting. As such, ISPs should maintain data for a sufficient period of time .

12.40 Where data relates to a specific offer (such as zero rating, differentiated retail offers and specialised services), we would expect the ISP to be able to provide the relevant data throughout the period the offer is active and for 18 months afterwards. In relation to general network performance monitoring and data on the use of traffic management, we would also expect ISPs to keep this data for 18 months.

Engagement with stakeholders

12.41 We expect there will be value in engaging with stakeholders at least annually, but will keep this under review. We will also keep under review the data and evidence we expect to gather as summarised above.

12.42 Overall, we consider our approach set out above will be effective, reasonable, and proportionate in monitoring compliance, and in accordance with the Regulation.

13. Conclusions on our approach to the net neutrality framework

Introduction

- 13.1 In general, our review indicates that net neutrality has supported consumer choice and enabled content providers to deliver their content and services to consumers. However, there are some areas where more clarity will enable ISPs to innovate and manage their networks more efficiently, which will improve consumer outcomes. To address this, we are issuing guidance.
- 13.2 In this section we summarise our updated guidance. In addition to the specific subjects covered in the rest of this statement some stakeholders noted that our guidance referred to the BEREC guidelines, which they considered could lead to a lack of clarity and confusion. We agree that it would be clearer and more helpful to have the net neutrality guidance in a single place and have therefore updated our guidance so that it sets out our approach to the current net neutrality framework in a comprehensive way. We explain how we have updated our guidance further below.
- 13.3 In addition, a number of stakeholders argued that the time is right for wider review of the rules, suggesting that changes would be appropriate. We provide our thoughts on these responses below. However, any change to the rules is a matter for Government and Parliament.

Our updated guidance

- 13.4 We are issuing guidance that clarifies our approach to assessing compliance with the rules, as discussed in Section 5 to 12. Our guidance includes clarification of the following areas.
- 13.5 Zero-rating offers are largely beneficial to consumers, although we may have concerns in limited circumstances. We identify three types of offer:
- i) **Type One:** content from public bodies, charities and NGOs that has social benefits and where there are no competitors providing the content;
 - ii) **Type Two:** genuinely open offers; and
 - iii) **Type Three:** all other offers, for which we set out the criteria that we will consider in assessing whether these offers are likely to cause a concern.
- 13.6 We are unlikely to be concerned about Type One or Type Two offers and once an offer has been categorised as one of these Types, we would be unlikely to examine it further. We will assess Type Three offers against the criteria set out in the guidance where relevant to assess whether we are likely to be concerned about these offers.
- 13.7 Access to zero-rated content after a general data allowance has been exhausted is generally prohibited, but we are unlikely to be concerned where access is allowed to:
- i) the ISP's own website or application in order for a user to top-up their data;
 - ii) Type One content; or
 - iii) access to emergency communications.

- 13.8 ISPs can offer retail packages with different levels of quality, as long as all traffic is treated the same within each retail offer. ISPs cannot offer retail packages where specific content is given a different level of quality within the package.
- 13.9 ISPs can use traffic management measures to manage their networks, including:
- i) reasonable traffic management to optimise their networks on an ongoing basis;
 - ii) additional traffic management measures to address exceptional or temporary network congestion; and
 - iii) traffic management measures that are configured on a permanent basis, as long as their effect is in line with reasonable traffic management or the additional measures explained above.
- 13.10 Our guidance includes how ISPs can approach identifying the technical characteristics of traffic in order to treat traffic based on these characteristics when using traffic management.
- 13.11 We are unlikely to be concerned where ISPs use traffic management in relation to:
- i) internet access services provided on transport or in public spaces, where this is used to give a reasonable level of service to as many users as possible in circumstances where expansion of capacity to meet all user demands may be impractical;
 - ii) the prioritisation and zero-rating of all communications with the emergency services;
 - iii) blocking access to fraudulent or scam content;
 - iv) the use of parental controls and other content filters involving the blocking of traffic; and
 - v) other cases such as allowing access to information for vulnerable consumers and blocking access to intimate images.
- 13.12 ISPs should not place restrictions on the use of terminal equipment in agreements for internet access services. Our guidance explains how ISPs can use traffic management and fair use policies to address excessive usage.
- 13.13 ISPs can offer specialised services where:
- i) optimisation is required to provide the service, including taking into account the nature of the shared infrastructure on mobile access networks which can lead to greater variability of service quality;
 - ii) there is sufficient capacity available to continue to provide internet access services in addition to specialised services; and
 - iii) specialised services do not offer a replacement for internet access services.
- 13.14 In offering zero-rating and retail offers with different levels of quality or specialised services, ISPs must be transparent about these services so that consumers can make informed decisions. Similarly, ISPs must be transparent on their approach to traffic management for each internet access service they offer. In providing this information ISPs must meet their obligations under the net neutrality rules and under the general conditions.
- 13.15 ISPs should be able to provide us with information to monitor their compliance with the framework. We expect to gather data at least annually in relation to:
- i) general network performance, particularly information on network congestion;
 - ii) traffic management policies, and data on the use of additional measures beyond reasonable traffic management;

- iii) information on zero-rating, retail offers with different levels of quality and specialised services that they offer.

13.16 We expect to gather other information necessary for us to check compliance with the rules on a case-by case basis.

Replacing the BEREC guidelines

Stakeholder responses

13.17 Some stakeholders commented that our guidance still referred to the BEREC guidelines, which could lead to a lack of clarity and confusion. They said that having a single document including all the guidance in one place would be preferred.

13.18 Vodafone said that this could lead to confusion and we should instead refer to the legislation, GCs and our guidance only.⁴⁷⁷ UKCTA made similar arguments and argued that as a matter of best practice, Ofcom’s guidance should be self-contained and comprehensive, where possible, and that it would take precedence over other guidance.⁴⁷⁸ The BBC and ISPA sought clarity on the status on BEREC guidelines in light of Ofcom’s updated guidance.⁴⁷⁹ techUK flagged concerns around the role of BEREC guidelines, although noted they were being used to help provide a comprehensive set of guidance on our approach to net neutrality.⁴⁸⁰

Our revised approach

13.19 In the 2022 Consultation we indicated the BEREC guidelines were relevant to our interpretation of the net neutrality rules where we did not provide our own guidance. We agree with stakeholders that it would be clearer and more helpful to have the net neutrality guidance in a single place and therefore we have incorporated the relevant sections of the BEREC guidance into our guidance so that it sets out our approach to the current net neutrality framework in a comprehensive way.

13.20 In order to make our guidance more comprehensive, we have included new text in the following areas, which were included in the BEREC guidelines (but which we did not include in the proposed guidance in our 2022 Consultation):

- We have added new text in relation to aspects of Article 3(1) and 3(2) in a section titled “Safeguarding Open Internet Access”. This section incorporates guidance from the BEREC guidelines, in particular in relation to equal treatment of traffic and agreements between end-users and ISPs, end-user imposed restrictions, the prohibition on sub-internet offers and guidance that interconnection is outside the Regulation, but may be considered where the approach to interconnection is implemented in such a way as to circumvent the Regulation.
- We have collated the various aspects of the BEREC guidelines on Virtual Private Networks (VPNs) into a single sub-section within the Scope of the Regulation section.
- We have added guidance on transparency in relation to volume limitations.

⁴⁷⁷ [Vodafone response](#) to the 2022 Consultation, response to question 3.

⁴⁷⁸ [UKCTA response](#) to the 2022 Consultation, para. 3- 4.

⁴⁷⁹ [BBC response](#) to the 2022 Consultation, para. 17; ISPA response to the 2022 Consultation, additional information in response to questions 1- 4.

⁴⁸⁰ [techUK response](#) to the 2022 Consultation, response to question 3.

- We have added guidance on our approach to Wi-Fi in public spaces, as discussed in Section 8.

Wider legislative change

13.21 We have set out in the previous sections our view on legislative change in specific areas. While we did not seek views on wider changes to the legislation, we received several responses that raised this topic.

Stakeholder responses

- 13.22 A number of ISPs (BT Group, [X], Virgin Media O2, Three, Vodafone and KCOM) and another respondent [Y] argued that the current rules are overly prescriptive, meaning they are not sufficiently flexible and act to restrict ISPs' ability to develop new products and services that would benefit to consumers.⁴⁸¹ These respondents argued that the current regulation was not necessary and that a principles-based approach, either through Codes of Practice or in legislation with scope for Ofcom to set more detailed guidance, would be sufficient. They suggested Ofcom engage with Government to undertake a wider review.
- 13.23 Sky argued that the current approach to regulation works well and there is no compelling evidence to support a change in the regime.⁴⁸²
- 13.24 Several content providers (the BBC, ITV and Netflix) argued against any change, saying the current Regulation is necessary and appropriate to ensure the internet remains open, and that arguments for the need for change are unclear, unevidenced and subject to change.⁴⁸³
- 13.25 ISPA argued that while the net neutrality rules have functioned well so far, there is significant change to the landscape and suggested Ofcom should consider broadening the scope of the regime to cover the whole value chain.⁴⁸⁴ UKCTA argued that a level playing field is needed and suggested Ofcom work with the DRCF to ensure all regulators of digital communications services have a consistent approach to ensure a level playing field.⁴⁸⁵
- 13.26 [Y] argued that net neutrality regulation harms consumers, slows deployment of new technologies, in particular 5G, deters innovation and distorts broadband markets.⁴⁸⁶

Our view

- 13.27 We set out below our view on stakeholder responses, but clearly any change to legislation is a matter for Government and Parliament.
- 13.28 Our view is that the current framework has been effective in safeguarding the open internet in terms of allowing consumers to access content of their choice and in allowing content

⁴⁸¹ [BT Group response](#) to the 2022 Consultation, Overview and para. 65- 68; [X] response to the 2022 Consultation para. 5.1- 5.6; [Virgin Media O2 response](#) to the 2022 Consultation, Section 6; [Three response](#) to the 2022 Consultation, p. 16; [Vodafone response](#) to the 2022 Consultation, para. 1- 17; [KCOM response](#) to the 2022 Consultation, para. 13; [Y] response to the 2022 Consultation, para. 2- 14.

⁴⁸² [Sky response](#) to the 2022 Consultation, pp. 1-2.

⁴⁸³ [The BBC response](#) to the 2022 Consultation, para. 15; [ITV response](#) to the 2022 Consultation, pp. 1-2; [Netflix response](#) to the 2022 Consultation, p. 3.

⁴⁸⁴ [ISPA response](#) to the 2022 Consultation, further comments in responses to questions 5-9.

⁴⁸⁵ [UKCTA response](#) to the 2022 Consultation, para. 11.

⁴⁸⁶ [Y] response to the 2022 Consultation, Executive Summary.

providers to deliver their content to end users without needing to make agreements with ISPs. However, some aspects of the rules have restricted how ISPs develop their services and run their networks, either because the rules are unclear (or ISPs' understanding of the interpretation that we would take as the enforcement body is unclear), or the rules clearly restrict certain activities that may deliver positive outcomes for consumers.

- 13.29 Where possible we have addressed this through our guidance, which sets out how we expect ISPs to comply with the rules. The guidance also indicates how we would approach activities that are likely to benefit consumers but which may not be fully consistent with a strict interpretation of the rules. In particular, the guidance addresses a number of concerns raised by stakeholders that the rules are unclear on how they can develop innovative new services and manage their networks as market conditions and technology develops.
- 13.30 In some areas regulated by Ofcom, legislation sets out principles and outcomes, and requires Ofcom to implement regulations to meet these. While our guidance addresses many of the issues raised by stakeholders within the current legislative framework, we believe an alternative approach, with legislation setting out principles that can be supplemented as needed with more detailed regulations and supporting guidance, could be beneficial. This principles-based approach could be particularly helpful in relation to net neutrality, given that digital markets are fast moving, with a risk that detailed, prescriptive rules could become obsolete or be a barrier to innovation. For example, the Digital Markets, Competition and Consumer Bill (DMCC Bill) currently before Parliament takes such an approach. Our view is that a similar approach to net neutrality could deliver the good outcomes we have found to date under the current rules, while also providing additional flexibility for beneficial changes in technology and new innovative approaches to be considered more quickly by Ofcom without the need for legislative change. As noted above, any change to legislation, including what obligations should be placed on Ofcom and what powers Ofcom should have to implement those obligations, is a matter for Government and Parliament.
- 13.31 In relation to responses about extending the scope of the net neutrality rules, where there are competition concerns in relation to other parts of the value chain, there are various competition policy and regulatory tools already available and the DMCC Bill seeks to establish a regulatory framework for digital platforms with entrenched market powers, which are not covered by the net neutrality rules.
- 13.32 Further, the scale of certain players at one level in the value chain, does not necessarily mean that regulation at a different point in the value chain becomes less warranted. Nonetheless, we recognise the scope for large firms not covered by the scope of the net neutrality rules to influence outcomes. We have considered this, including the traffic flows generated by large content providers, in our review.

The overview section in this document is a simplified high-level summary only. The decisions we have taken and our reasoning are set out in the full document.