Digital markets in the communications sector

Ofcom's approach to competition and consumer issues in internet-based communications markets

Welsh overview available

Contents

1. Overview

As people communicate seamlessly online and offline, we now need to invest our efforts into making digital communications work for everyone

1.1   Since Ofcom was created 20 years ago, the way we all buy products, get information, and use public services has been transformed by the internet. This is especially true for the way we communicate and consume media content.

1.2   In the communications sector, the internet now underpins the networks that have typically supplied our services, from calling and messaging to television and other media. At the same time, it provides alternatives that supplement and substitute for the ways we communicate.

1.3   How well digital markets function will be increasingly important to the outcomes consumers experience across the sectors we regulate. We need to be looking as much at how companies are using digital infrastructure and services as we do the cables, masts and satellites that we have focused on in the past.

1.4   This document sets out our strategy for Ofcom to adapt to this new reality so that we can continue to deliver the outcomes consumers expect from their communications services.
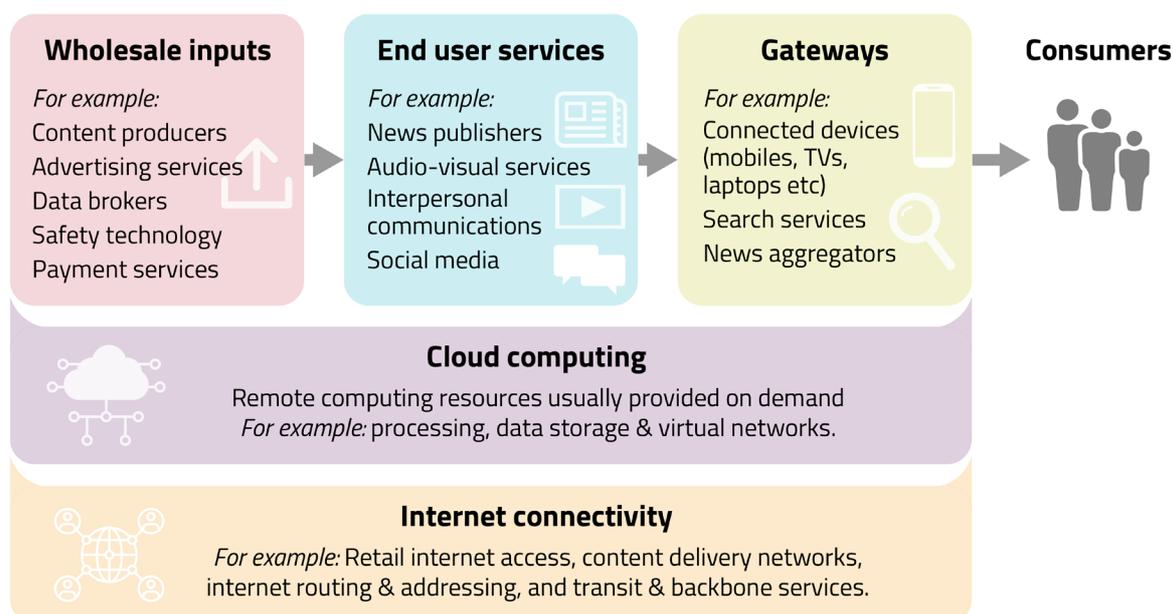
The way consumers communicate has changed

1.5   While some consumers continue to rely solely on traditional telephony and TV, these are now in the minority; for example, 94% of adults use online platforms like Whatsapp to send messages or make calls. We have seen subscription video on demand giving consumers greater choice, and platforms that empower everyone to create and share their own audio-visual content. Text messages and even letter volumes are being gradually eroded by digital alternatives. The common thread is the disruption from online networks and services.

1.6   The difference between digital communications and traditional services is often now invisible to consumers, with iPhones delivering messages over iMessage or SMS, and smart TVs accessing content via streaming or terrestrial TV. This seamlessness creates great services, but also risks for consumers if they unknowingly rely on services where they do not benefit from the same protections they would expect.

The way firms deliver services has changed

1.7   Digital technologies have unlocked innovative ways to deliver communications services with greater functionality, efficiency and control. Companies are now using cloud services to do everything from running telecoms networks to distributing TV content. Digital communications are no longer just common: they are ubiquitous.

Figure 1: The digital communications value chain

Wholesale inputs	End user services	Gateways	Consumers
For example: Content producers, Advertising services, Data brokers, Safety technology, Payment services	*For example:* News publishers, Audio-visual services, Interpersonal communications, Social media	*For example:* Connected devices (mobiles, TVs, laptops etc), Search services, News aggregators	

Cloud computing
Remote computing resources usually provided on demand
For example: processing, data storage & virtual networks.

Internet connectivity
For example: Retail internet access, content delivery networks, internet routing & addressing, and transit & backbone services.

1.8 The evolution of business models that deliver these services has led to some platforms becoming essential trading partners for businesses to reach consumers. It has also resulted in the presence of strong, vertically-integrated global firms that control many of these platforms. Few digital communications and broadcasting services are delivered to end-customers without the involvement of a multinational tech company, whether in the development, distribution, or through the device in the consumer's hand.

1.9 In some cases the strength of these firms means others cannot compete fairly, risking holding back innovation, investment and growth, and harming the people and businesses that rely on these services. More generally, as digital markets have become central to all aspects of communications, competition failures in these markets have the potential to undermine existing competition in critical services.

We have to change our focus too

1.10 Ofcom's mission remains to make communications work for everyone. As the UK communications regulator, Ofcom has statutory duties to promote competition, to protect consumers from harm, and to secure a wide range of other policy objectives that includes maintaining sufficient plurality in TV and radio, and protecting consumers from illegal or harmful content. However, we only intervene where necessary to support healthy and flourishing markets that work well across the outcomes we care about. This balance is the basis on which we work to deliver for consumers.

1.11 The integration of digital markets in communications make them essential to delivering on Ofcom's purpose. All of our functions today require us to consider the opportunities and risks from digital disruption if we are to continue to deliver effectively. The way consumers now communicate, and the way companies serve them, require us to think about digital

markets as much as we have considered traditional telecoms, media and technology sectors in the past.

1.12   So we will respond more directly on digital issues affecting communications, informed by our role as a converged regulator, looking across all of our sectors and our duties. We will prioritise:

- **Promoting an environment where consumers can continue to benefit from competitive markets.** For example:

  – Services like WhatsApp or Netflix are gradually replacing services like SMS or linear TV. These shifts to online should not mean that consumers are less protected from a lack of competition or sharp practices.

  – Cloud services are increasingly important to many businesses across the economy, including the telecoms and broadcasting sectors. As demand for cloud services continues to grow, it is important that we understand how these markets function and whether they are working well for consumers.

- **Considering wider public policy objectives as we protect users and promote competition**. As part of our wider duties we have several objectives, beyond making markets work effectively, that remain of vital importance to society and to individuals. Thinking about competition and these wider objectives in the round has been part our work as a converged regulator. For example:

  – Our recent joint Ofcom/Competition and Markets Authority (CMA) advice to Government on the relationships between news publishers and digital platforms sought to ensure that potential pro-competitive interventions also support media plurality.

  – Ofcom has duties to protect consumers from harmful content on UK-based video-sharing platforms, which are expected to be expanded with the [Online Safety Bill](#). Our work to promote competition cannot undermine these key objectives, and we have already started to think about interactions between these regimes.

Specific areas of focus over the next year and beyond

1.13   We will undertake a programme of work to examine how digital markets are working for consumers, investment and innovation in the communications sectors. This programme will be supported by our technology engagement programme, horizon scanning, and collaboration with other regulators. We will be running four targeted projects which are of particular importance to UK consumers and the functioning of digital markets.

1.14   Our main area of work over the coming year will be a market study under the Enterprise Act 2002 into cloud services in the UK. Cloud services are already established as a critical component of how digital services are delivered. The largest providers of cloud services are Amazon (AWS), and Microsoft (Azure) and Google (GCP). We will assess the strength of competition in cloud services and the position these companies hold in the market. We will also consider whether any competition issues we may identify have an adverse impact on consumer outcomes generally, including in our core markets of telecoms and broadcasting.

1.15   We will also focus our work on the following areas:

- **Net neutrality:** we will shortly be consulting on our future approach to net neutrality, which looks at the relationship between internet service providers and online content providers.
- **Digital content gateways**: we will examine the risk that digital content gateways (connected televisions, smart speakers/digital assistants) become an essential route to market in ways that might distort competition, ultimately impacting on the range, quality or pricing of content available to consumers.
- **Online personal communications services**: we are interested in how these services (such as WhatsApp or Zoom) are impacting traditional calling and messaging markets, and how developments in these markets may impact on our duties relating to competition, consumer protection, access to essential services and securing end to end connectivity.

We will work with other digital regulators to serve consumers together

1.16   Whether using consumer data, offering financial services, or competing across complex markets, digital companies face growing expectations over how they conduct themselves. As regulators, we need to raise the bar for industry while minimising the burden we place on them.

1.17   To achieve this, we need to co-ordinate effectively, particularly between those with competition and data responsibilities (Ofcom, Competition and Markets Authority (CMA), the Information Commissioners' Office (ICO) and the Financial Conduct Authority (FCA). The Digital Regulation Cooperation Forum (DRCF) will play a key role in meeting the challenges of coordination and cooperation raised by internet-based service markets.

2. Introduction

The changing context

The way consumers communicate has changed

2.1   The internet has fundamentally changed the way we communicate with each other and how we consume content. We have seen subscription video on demand giving consumers greater choice, and platforms that empower everyone to create and share their own audio-visual content. Text messages and even letter volumes are being gradually eroded by digital alternatives. The common thread is the disruption from online networks and services.

2.2   While some consumers continue to rely solely on traditional telephony and TV, they are now in the minority. For example:

a)   94% of UK adults (16+) use online platforms like Whatsapp to send messages or make calls[1]; and

b)   young people on average spent 79 minutes per day viewing content on subscription video on demand (SVoD) on average compared to 53 minutes on live TV per day. [2]

2.3   Innovations bring many benefits for consumers, including easier access to services, lower prices and increased choice of products and suppliers. The difference between digital communications and traditional services is often now invisible to consumers, with iPhones delivering messages over iMessage or SMS, and smart TVs accessing content via streaming or terrestrial TV. That seamlessness creates benefits, but also risks for consumers if they unknowingly rely on services where they do not have the same protections they might expect.

The way firms deliver services has changed

2.4   Digital technologies have unlocked innovative ways to deliver communications and content services with greater functionality, efficiency and control. For example, companies now routinely use cloud services[3] to do everything from running telecoms networks to distributing TV content.

2.5   New business models emerge all the time online. But some of these business models have led to platforms becoming essential trading partners for businesses to reach consumers. It has also resulted in the presence of strong, vertically-integrated global firms that control many of these platforms.

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[1] Ofcom Adults' Media Literacy 2021: Online Behaviours and Attitudes survey.
[2] Ofcom estimates of total video viewing. Modelled from BARB, Comscore and TouchPoints.
[3] Cloud services are all services involved in the provision of cloud computing, which is the provision of remote access to computing resources (compute, storage and networking) on demand and over a network.

2.6   There is a risk that these new bottlenecks or the concentration of market power could hold back innovation, investment and growth, and potentially causing harm to the people and businesses that rely on these services. More generally, as digital markets have become central to all aspects of communications, competition failures in these markets have the potential to undermine existing competition in critical service supply.

The changing regulatory landscape

2.7   Online markets have also challenged existing regulatory systems. The Government has recognised the need for specific additional tools and announced plans to create a new Digital Markets Unit to be housed within the CMA. The proposed new Digital Markets pro-competition regime is designed to address specific competition issues stemming from tech firms having substantial and entrenched market power and a strategic position in the UK economy – or Strategic Market Status or SMS. Ofcom is expected to have an advisory and referral role in this regime. [4]

2.8   However, there remains a clear role for the wider UK regulatory landscape for competition. This includes tools related to antitrust under the 1998 Competition Act, and mergers, market studies and investigations under the 2002 Enterprise Act, as well as a range of sectoral competition regimes.

Ofcom's evolving role

2.9   Ofcom's principal duties are to further the interests of citizens in relation to communications matters and of consumers in relevant markets, where appropriate by promoting competition. A summary of our relevant competition and consumer powers is set out in Annex 1.

2.10   Since it was founded, Ofcom has acted to open markets to competition. Our work in telecoms has moved the sector from reliance on a dominant telecoms provider to a highly competitive and innovative industry. In our most recent Wholesale Fixed Telecoms Market Review we saw the realisation of many of our ambitions, with widespread competition allowing the deregulation of many markets and a focus on the promotion of network level competition. We have also acted to ensure that consumers are treated fairly in terms of contract terms and switching providers, and we have protected the most vulnerable, e.g. by requiring video relay services to enable people who use British Sign Language to call the emergency services.

2.11   We have also utilised our competition powers in broadcasting. For example, we have intervened to protect competition in broadcasting by ensuring that the Electronic Programme Guides (EPGs) that enable broadcasters to reach audiences are available on fair, reasonable and non-discriminatory terms; [5] and we prevented individual firms from

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[4] See DCMS and BEIS, A new pro-competition regime for digital markets - government response to consultation, 6 May 2022.
[5] For example, see our 2020 statement following our review of competition rules in the EPG code.

exploiting their ownership of exclusive content rights in ways that could undermine competition in pay-TV markets.[6]

2.12   As a converged regulator, Ofcom is able to utilise its competition powers to address consumer and citizen concerns across its remit that includes telecoms, broadcasting, post, spectrum and online services. In doing so, we are also able to draw on our experience and expertise of delivering across a wide range of other policy objectives that we have responsibility for, including maintaining sufficient plurality in TV and radio, and protecting consumers from illegal or harmful content.

2.13   This converged approach could not be more relevant today as it reflects how everyone experiences communications, which is simultaneously as consumers, audiences, users and citizens. As the boundary between online and offline activity blurs, the digital disruption that is reshaping our industries today is also blind to traditional sector boundaries.

2.14   Work on digital markets is not new to Ofcom. We are already actively engaged in digital markets in our research, our market analysis and our consideration of consumer needs. For example:

   a)   We provided advice to the Government on how commercial negotiations between public sector broadcasters and connected TV platforms might need to be regulated to ensure the widespread availability and prominence of public service media.

   b)   We will shortly be consulting on our future approach to 'net neutrality', which looks at the relationship between internet service providers and online content providers.

   c)   With the CMA, we provided advice to the Government on the creation of a new digital markets competition regime and how this regime might be applied in managing the commercial relationships between online platforms and news publishers.

2.15   But now we need to respond more directly on digital issues affecting communications, informed by our role as a converged regulator, looking across all of our sectors and duties. This is essential if we are to continue to deliver on our purpose effectively. The way consumers now communicate, and the way companies serve them, require us to think about digital markets as much as we have considered traditional telecoms, media and technology sectors in the past.

2.16   In the rest of this document we set out how our focus will shift towards digital markets and our immediate plans for work in this area. While the Government has brought forward legislation to give Ofcom new responsibilities for online safety, this is not the focus of this document.

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[6] Ofcom, Review of the pay TV wholesale must-offer obligation, 19 November 2015.

3. The value chain for digital communications

3.1   As the UK's communications regulator, Ofcom aims to ensure that markets work effectively across all the economic activities involved in delivering communications services, including online digital communications. In this section we map out this set of activities.

3.2   These activities can be organised into five broad service categories:

a)   At the centre are **end-user services**. These include messaging services like WhatsApp; content services like Netflix; and other services like Facebook that combine elements of messaging and content dissemination. Some online services are substitutes for traditional communications services (e.g. Netflix competes with broadcasters, while WhatsApp competes with traditional telephony and SMS services), while others (e.g. Facebook) lack direct counterparts among traditional communications services.

b)   A second set of activities of interest are those involved in providing **connectivity** between consumers and the services they use – whether these are related to communications, like WhatsApp, or not, like Ocado.com. This includes the telecoms and broadband networks and services that Ofcom has always regulated, as well as a range of internet-specific infrastructure and wholesale services, including content delivery networks (CDNs) and Domain Name System (DNS) registries and registrars.[7]

c)   A third area of interest are the digital content **gateways** that consumers use to discover, access and interact with online communications and content services. This broad category includes online search engines and news aggregators, as well as a range of consumer devices that combine hardware, 'app stores', operating systems and user interfaces (key examples include smartphones, connected TVs and smart speakers/ digital assistants).

d)   A fourth area of interest is the provision of **cloud computing** that provides flexible and efficient computing resources and is already established as a critical component of how digital services are delivered. 'Cloud computing' is the provision of remote access to computing resources (compute, storage and networking) on demand and over a network, whereas 'cloud services' are all services involved in the provision of cloud computing. Nearly all online services 'run on' cloud infrastructure, whether self-provided or provided by others. Cloud services and connectivity services are becoming increasingly interlinked, with cloud providers relying on connectivity providers to connect to their customers; telecoms operators beginning to 'virtualise' parts of their networks; and cloud providers beginning to offer last-mile 5G networks to industrial clients.

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[7] CDNs assist broadcasters and other content owners to provide high quality on demand services through local caching of content nationally or globally. DNS allocate and record the underlying address system of the internet – IP domains.

e) Finally, there are **other wholesale inputs** to end-user communications services, such as content production (from newswires to independent TV producers), to advertising technology, to technology solutions to keep consumers safe online ('safety tech').

3.3   The five categories above are summarised visually in Figure 2. We set out more detail in Annex A2.

Figure 2: The high-level value chain for internet-based digital markets communications services[8]
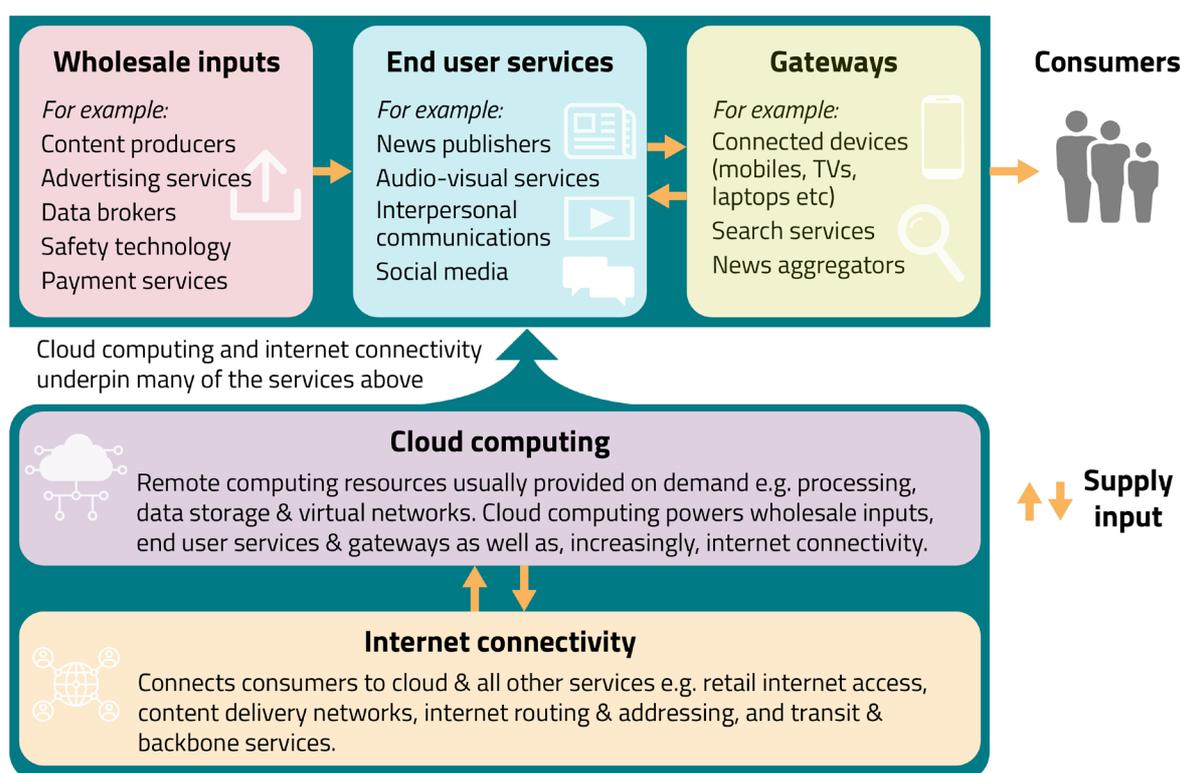
3.4   Mapping these activities has allowed us to observe certain key features of these markets which will be relevant to our future work:

a) Some online platforms offer a **range of services in one place**, which in turn can blur boundaries between previously separate markets. For example, Facebook simultaneously hosts news, video content and interactions with friends.

b) Many online firms, particularly, the Big Tech[9] firms, operate in many parts of the value chain. Service delivery often involves **complex ecosystems** of mutually supporting services (e.g. Google's role in operating systems, digital assistants, search, content delivery and smart home services).

c) Many online services rely on **consumer data** as a critical input to train algorithms and improve the quality of their service, e.g. in making personalised recommendations to

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[8] Produced drawing on research and analysis provided by Anaysys Mason which has been published alongside this statement.
[9] Big Tech is usually used to refer to Amazon, Meta, Google, Microsoft and Apple.

customers on what content they may like to see. This can be a significant driver of economies of scale, which can favour incumbents who already have many customers.

d) Online business models exhibit **new types of business relationships** where different commercial entities may rely on each others' services, content or data, without money changing hands, without a clear buyer-seller relationship, and sometimes without even a contract at all – even though joint value creation and bargaining still do take place. Examples include the relationship between search engines and third-party websites (e.g. news publishers); between app stores and app providers (e.g. ITV Hub in a smart TV platform); and between ISPs and content providers.

3.5   While Ofcom has an interest in all the activities involved in delivering digital communications services, Ofcom's competition-related work in digital markets will focus on key areas of strategic importance, which we set out in the section below.

4. Ofcom's focus in digital communications markets

Our strategy: a converged approach to digital markets

4.1   Ofcom will focus its efforts in digital markets where it is necessary to delivery against its purpose as the UK communications regulator, and informed by its role as a converged regulator.

4.2   Our strategic focus will be on two clear areas: using our experience and expertise to promote competition and protect consumers so that the consumer and citizen outcomes we care about are maintained; and where we are best placed to consider competition issues given strong links with our broader remit. Specifically, we will:

a) **Promote an environment where consumers can continue to benefit from competitive markets.** We expect this to be particularly relevant in digital markets that interact closely, whether as substitutes, inputs or otherwise, with those that we have traditionally regulated. For example:

   i)   Services like WhatsApp or Netflix are gradually replacing services like SMS or linear TV, and telecoms networks and broadcasters are becoming increasingly reliant on internet infrastructure like cloud computing. These shifts to online should not mean that consumers are less protected from a lack of competition or sharp practices.

   ii) New wholesale services such as cloud services are increasingly important to many businesses across the economy, including the telecoms and broadcasting sectors. It is important we understand how these markets function and whether they are working well for consumers.

b) **Consider wider public policy objectives as we protect users and promote competition.** As part of our wider duties we have several objectives beyond making sure markets work effectively, which remain of vital importance to society and to individuals (set out in Figure 3). Competition should support and not hold back achieving these objectives, which has been a fundamental part of our work as a converged regulator. For example:

   i)   Our joint Ofcom/CMA advice to Government on the relationships between news publishers and digital platforms sought to ensure that potential pro-competitive interventions would also support media plurality.

   ii) Ofcom has duties to protect consumers from harmful content on UK-based video-sharing platforms – duties which are expected to be expanded with the Online Safety Bill. Our work to promote competition cannot undermine these key

objectives, and we have already started to think about interactions between these regimes.[10]

Figure 3: Ofcom's public policy objectives
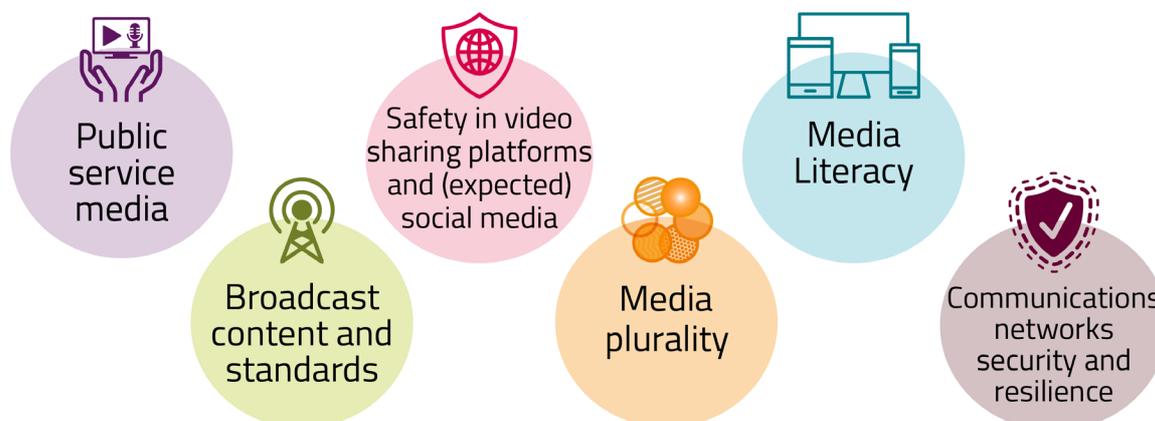
4.3   We will approach decisions on whether to act in relation to a competition concern, the priority we assign to an issue, and how we act (including whether we act ourselves or in support of another regulator) on a case-by-case basis. This will depend on considerations including the degree to which an issue engages our strategic focus, the immediacy and materiality of an issue, Ofcom's administrative priorities, and also the degree of relevance an issue has to the work of other regulators.

Working with other competition authorities

4.4   Regulation of digital markets is increasing in several areas. Whether using consumer data, offering financial services, or competing across complex markets, digital companies face growing expectations over how they conduct themselves. Many of the economic activities they engage in will not be specific to any one sector and will be of interest to multiple sectoral regulators, as well as to the cross-sectoral CMA. As regulators, we need to raise the bar for industry while minimising the burden we place on them.

4.5   It is ,therefore, vital that we work together with other regulators that have competition and data responsibilities (Ofcom, CMA, ICO and FCA) – so that we all act where we have expertise and our duties require us to and, in doing so, we support competition across the wider digital regulatory landscape.[11] The DRCF will play a key role in meeting the challenges of coordination and cooperation raised by internet-based service markets.

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[10] See the CMA-Ofcom joint statement on online safety and competition, 14 July 2022.

[11] Ofcom shares jurisdiction for competition issues in digital markets with other regulators who may be better placed to act in certain areas because they have specialist knowledge of a given market (e.g. payment systems are best understood by the Payment Services Regulator), or because their tools are best suited to the problem at hand (e.g. only the Digital Markets Unit will have tools designed to tackle 'ecosystem' effects linked to large tech firms, though Ofcom may be well placed to identify and refer issues).

Specific areas of focus for the next year and beyond

4.6   Over the next year we will carry out work to understand a number of digital markets in more detail. In some cases this will be through statutory mechanisms (e.g. a market study) while in others our work may be of a less formal nature, aimed at ensuring we are in a position to respond to any issues that do emerge.

Market study into cloud services in the UK[12]

4.7   Our main area of work over the coming year will be a market study under the Enterprise Act 2002 into cloud services in the UK. As set out above, cloud services are increasingly important to many businesses across the economy, including in the telecoms and broadcasting sectors. They play a critical role in the delivery of a range of communications services to consumers over the internet. As demand for cloud services continues to grow, competition in these markets will be increasingly relevant to our duties as the communications regulator.

4.8   The largest providers of cloud services are Amazon Web Services (AWS), Microsoft and Alphabet (parent company of Google). We will assess the strength of competition in cloud services and the position these companies hold in the market. We will also consider whether it is difficult for other providers to compete and any other adverse impacts on consumer outcomes generally.

4.9   The market for cloud services can be split into two broad areas which are characterised by different competitive dynamics. First, access to raw computing resources, i.e basic compute, storage and networking (often referred to as Infrastructure as a Service, IaaS), as well as services that can be used to develop, test, run and manage applications in the cloud (Platform as a Service, PaaS). We refer to this area of cloud as cloud infrastructure. Second, cloud software applications used by businesses and people for a wide variety of purposes (typically referred to as software as a service, SaaS).

4.10   Our study will focus on the first of these areas where we see the greatest risk of competition concerns, though we will also look at cloud more broadly to take into account how strength in SaaS might influence the competition dynamics in cloud infrastructure, and to consider the extent to which competition operates across the different vertical levels in cloud and portfolios of services.

4.11   The purpose of our market study is to explore if the market is working well. We will assess where competition concerns exist or could exist in the future, and at a high level consider how any such concerns could be addressed, while recognising that a full examination of this would, if necessary, be the subject of separate further work. We will look at how the market is working today and how we expect it to develop in the future. We believe this is

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[12] Ofcom's power to conduct market studies is set out in section 370 of the Communications Act 2003 and Part 4 of the Enterprise Act 2002.

particularly important in this study given the sector is still evolving, and there may be scope to identify potential competition issues before they become embedded.

4.12   We will be publishing shortly a formal notice of our intention to undertake a market study and a Call for Inputs which will set out in more detail the scope of our work and seek input from stakeholders on our plans.

4.13   The study will also support the CMA's wider programme of work in digital markets in the context of the Government's proposed Digital Markets Regime.

Other areas of focus

4.14   We have a broader programme of work to examine how digital markets are working for consumers, investment and innovation in the communications sectors. This programme will be supported by our technology engagement programme, horizon scanning, and collaboration with other regulators. Our ongoing net neutrality review also forms part of this programme of work. We have identified two specific new areas where we will consider whether and how to respond to any new or emerging issues that we find:

a)   **Competition in digital content gateways:** Online digital content gateways have emerged which mediate the relationship between content services and consumers. We have a particular interest in audiovisual gateways – connected televisions, smart speakers and the supporting digital assistants and operating systems – through which users access both traditional broadcast as well as on-demand and internet-native content. Our work on digital content gateways will seek to ensure continuity of competition and consumer outcomes. Poor competition outcomes could have the potential for a significant impact on UK broadcast and content creation markets, ultimately impacting on the range, quality or pricing of content available to consumers. Our first step will be to consider whether there are any potential underlying competition issues and if so what options might be available to address these.

b)   **Online personal communications services**: As communications services such as WhatsApp or Zoom have become more central to consumer communications, we need to ensure we understand how these markets are working and how they may impact consumer outcomes. We are interested in how these services will affect the role of traditional calling and messaging markets; how competition and innovation in these markets may evolve over the coming years; and any features in these markets, such as network effects and limited interoperability, that may give rise to potential concerns. We will consider how developments in these markets may be relevant to our duties relating to competition, consumer protection, network security, consumer access to essential services, and end-to-end connectivity.

A1. Relevant competition and consumer powers

A1.1   Ofcom has a range of powers which could apply across the five categories of activities set out in Section 3. Figure 4 summarises our powers that are relevant to our consideration of competition and consumer issues in digital communications markets:

Figure 4: Overview of Ofcom's current competition and consumer powers relevant to digital communications markets


Competition powers

Consumer powers

SMP and Access conditions   **General conditions**
Communications Act 2003

Market studies

Market investigation references

Anti-competitive agreements

Abuse of dominance

Enterprise Act 2002;
Competition Act 1998

Market studies

Unfair contract terms

Unfair commercial practices

Consumer rights

Enterprise Act 2002;
Consumer laws
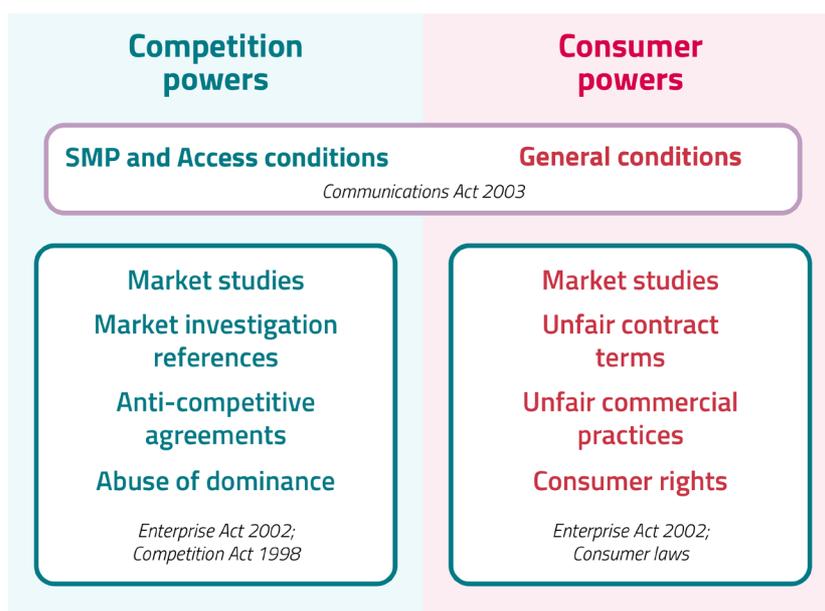
A1.2   We also anticipate that Ofcom will have a role in the proposed new Digital Markets regime. The government has said that it will introduce a statutory obligation for the Digital Markets Unit to consult with key regulators, which includes Ofcom, where appropriate and relevant, and notify the regulators when it opens a Strategic Market Status designation assessment. In addition, Ofcom will be able to formally refer competition concerns it has identified in its sectors if the Digital Markets Unit is better placed to address these concerns through its new powers. [13]

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[13] See DCMS and BEIS, A new pro-competition regime for digital markets - government response to consultation, 6 May 2022.

A2. The communications value chain in detail

End user services – how consumers engage with content and each other

Figure 5: Focused view on end user services within the high-level value chain
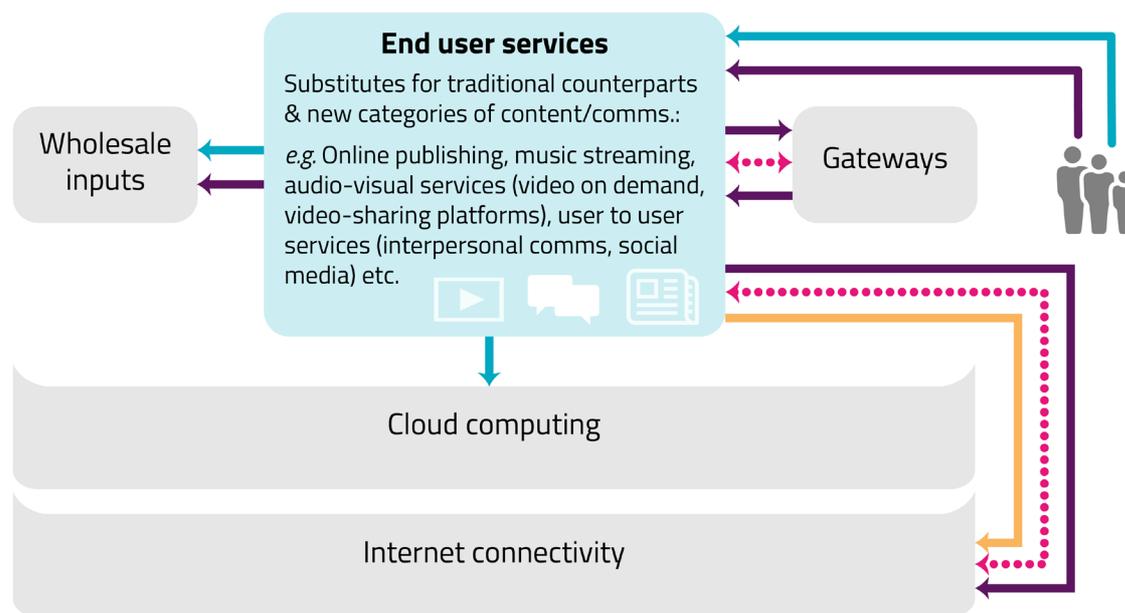
A2.1   At the centre of our focus are the communications services that consumers and businesses use and rely on. While traditional telephony, television and radio services remain central to our work, we have seen rapid growth in **internet-delivered end-user communications services**, including:

Services that consumers increasingly use as substitutes for traditional counterparts, e.g.:	
Messaging and telephony	New online communications services like WhatsApp or Zoom (sometimes referred to as 'number independent interpersonal communications services' or 'NIICS') act as substitutes for SMS messaging and telephony.

Services that consumers increasingly use as substitutes for traditional counterparts, e.g.:	
	• **94%** of UK adults (16+) use online platforms to send messages or make calls. [14] • **77%** of UK children (3-15) use online platforms to send messages or make calls. [15]
Broadcast-like services	Viewing of Video on Demand (VoD) services such as Netflix, Disney+ & Amazon Prime Video substitutes for traditional broadcasting channels. • **Young people aged 16-34 on average spend more time viewing subscription VoD (SVoD) than live TV in 2021 –** Young people on average spent 79 minutes per day viewing content on SVoD and 53 minutes on live TV per day. [16] • **67% of UK households subscribed to an SVoD service in Q2 2022.** Netflix remains the largest provider with 17.1 million households (60%) subscribing to the service, higher than pay-TV takeup which was 12.5 million of all households by Q2 2022. [17]
Digital post	Email is a substitute for post for many purposes. • **84%** people say emails are essential/fairly important in communicating with friends and family. • **82%** of online adults aged 15+ visited an email platform in September 2021. [18]
New categories of content and communications services, e.g.:	
User-to-user services	Services such as social media and video sharing platforms are communications services without a traditional counterpart. However, in some cases they may exert a disruptive effect on traditional communications. A number of these services are particularly popular among younger audiences. • **46 million (92% of UK online adults) visited YouTube** in March 2022. [19] • **18 million (36% of the UK online population aged 15+) visited TikTok** in March 2022 [20]

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[14] Ofcom Adults' Media Literacy 2021: Online Behaviours and Attitudes survey.

[15] Ofcom Children's and Parents' Media Literacy 2021: Online Behaviours and Attitudes survey (5,861)

[16] Ofcom estimates of total video viewing. Modelled from BARB, Comscore and TouchPoints.

[17] BARB Establishment survey

[18] © Ipsos, Ipsos iris Online Audience Measurement Service, Category: Email, 1 September– 30 September 2021, adults age: 15+, UK.

[19] © Ipsos, Ipsos iris Online Audience Measurement Service, 1 March – 31 March 2022, adults aged 15+, UK.

[20] © Ipsos, Ipsos iris Online Audience Measurement Service, 1 March – 31 March 2022, adults aged 15+, UK.

Internet connectivity – how the internet is delivered

Figure 6: Focused view on internet connectivity services within the high-level value chain
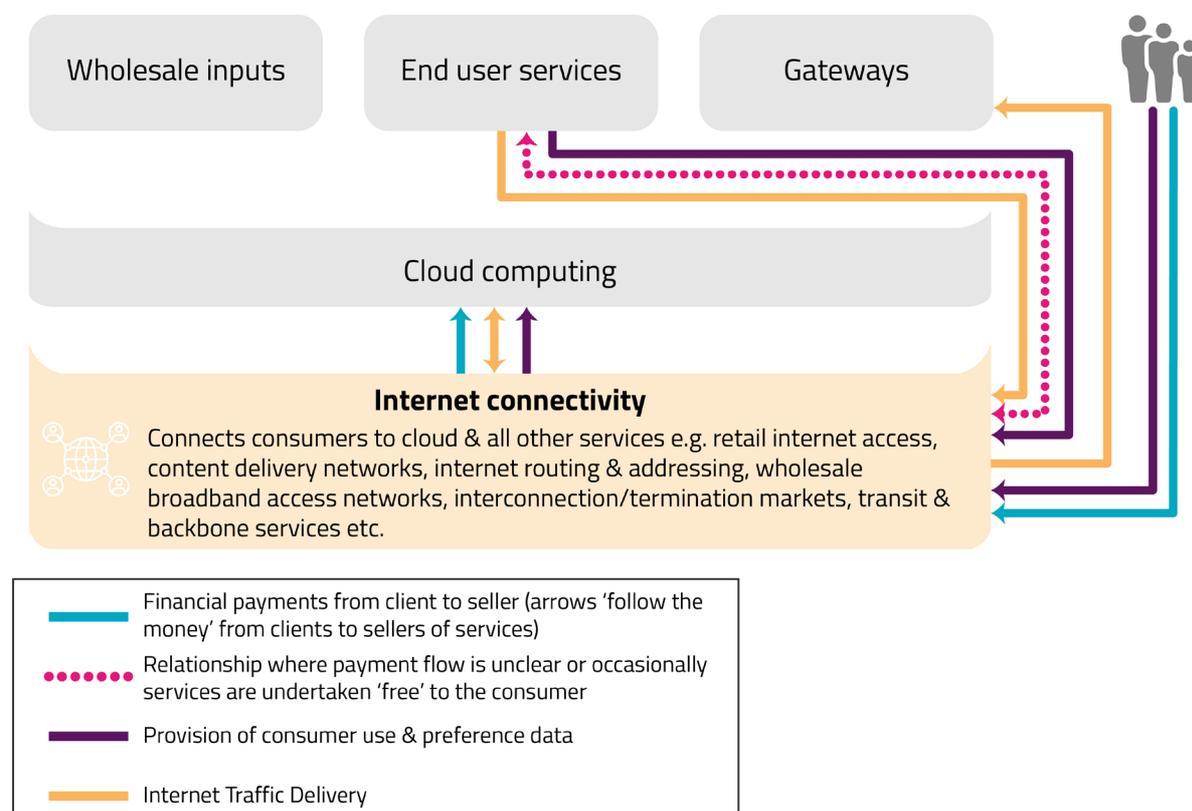
A2.2 Providers of end-user communications services must ensure that there is data connectivity between their core systems and end-users. For example, connectivity ensures that films streamed from Netflix's systems can reach users' TV sets and devices, or that messages from one WhatsApp user reach their intended recipients (via WhatsApp's own central systems). This is made possible by an ecosystem comprising multiple types of infrastructure and wholesale services, including:

a) Content delivery networks (CDNs) – distributed and interconnected servers and other infrastructure which store and provide content (video, audio, games, services) in locations close to the user to speed up delivery, reduce network congestion and improve quality of experience

b) Internet routing and addressing services– such as the Domain Name System (DNS), the internet's 'address book' where 'names' like bbc.co.uk are registered, managed by a globally distributed hierarchy of organisations and infrastructure providers

c) The wholesale and retail broadband networks (access, backhaul and core) that link end users' premises and mobile devices to all of the above

d) Internet interconnection / termination markets – whereby different network operators reach deals with each other to exchange traffic

e) Internet transit and backbone services – allowing other networks without direct interconnection deals to reach each other

A2.3   Competitive dynamics in some internet connectivity markets are fluid as a result of constantly growing bandwidth demand and fast innovation. Connectivity providers often operate 'two-sided' (or 'multi-sided') business models linking multiple kinds of customers or counterparts; for example, internet transit providers mediate between different ISPs well as between them and content providers.

Digital content gateways – connecting consumers and content

Figure 7: Focused view on gateways within the high level value chain
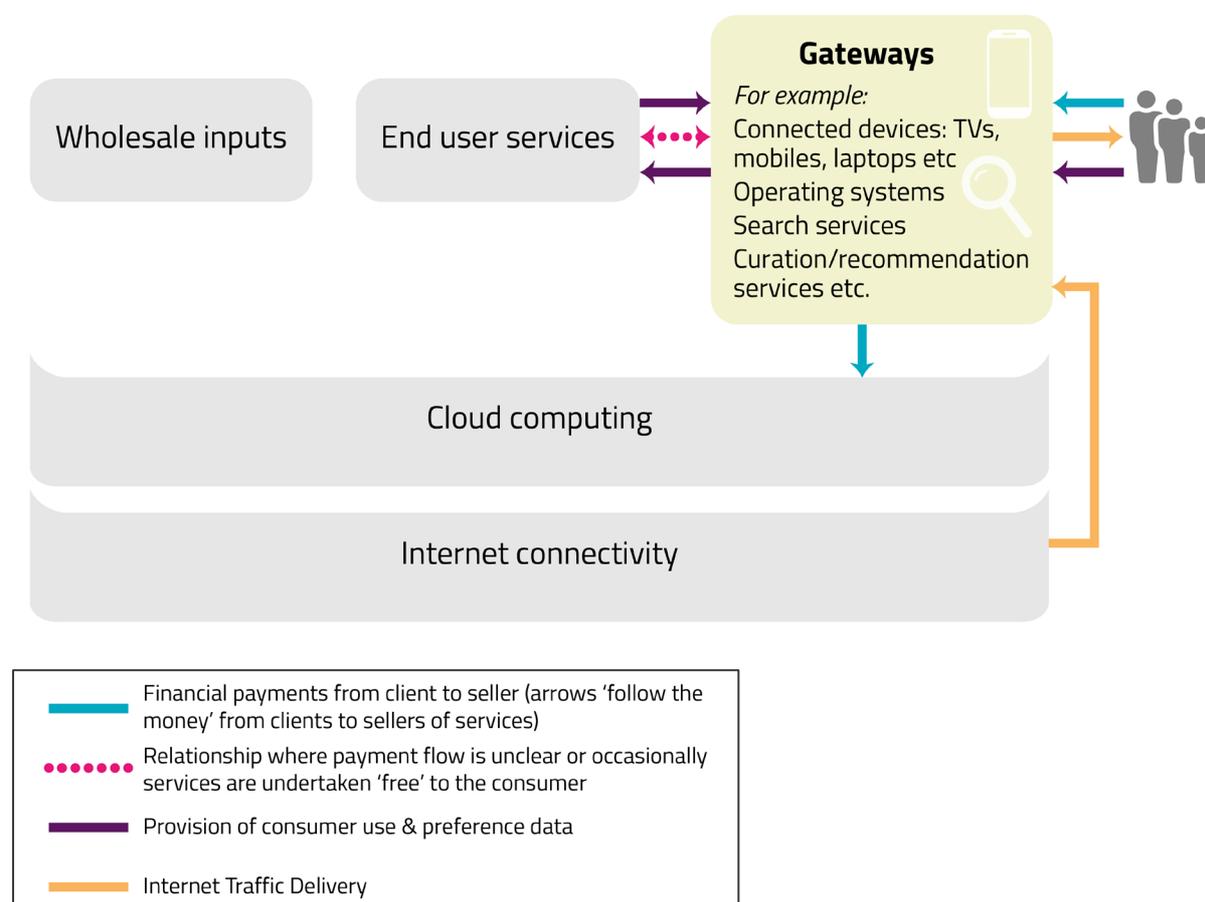

A2.4   To reach end-users, the providers of end-user services often rely on digital content gateways. These perform a number of different functions of broadly two types:

a) **Access functions** ensure that users can find and get to end-user services. Relevant gateways include connected TV platforms (e.g. Amazon's Fire TV or Samsung's Tizen TV), digital assistants (e.g. Alexa / Google Assistant), tablets and mobile phones or Apple's IOS and app store. In most of these cases devices, operating systems and app stores work together and can jointly be considered as comprising a gateway service, even though in some cases these three components are not provided by the same firm.

b) **Discovery functions** can ensure that users for a type of service or content are directed to a relevant online service. Examples include search engines; 'curated' recommendations in device app stores and connected TV user interfaces; and social media and news aggregators as a means to 'discover' content on news publishers' websites (e.g. for each year between 2010-2020, Google generated around 90% or more of UK search traffic).

Cloud computing

Figure 8: Cloud services in the high level value chain
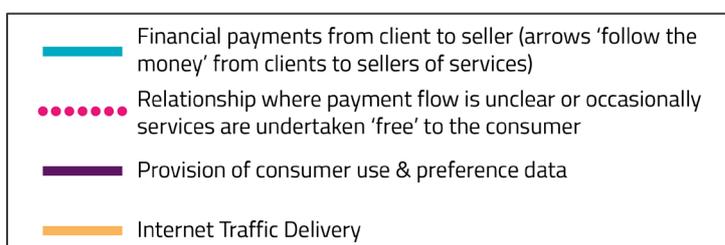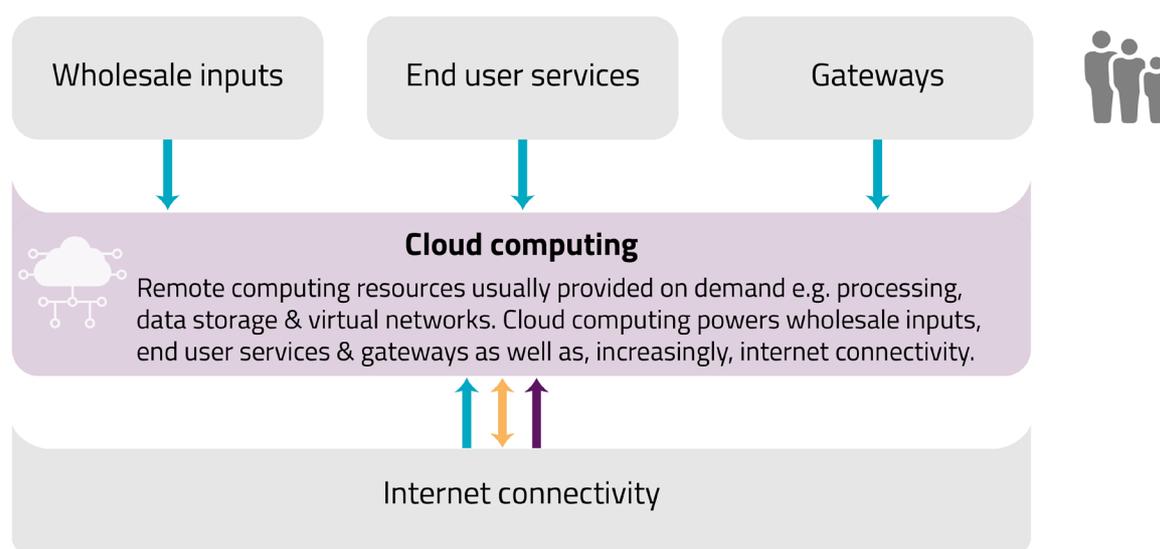
A2.5   Cloud services are all services involved in the provision of cloud computing, which is the provision of remote access to computing resources on demand and over a network. They include processing, storage, networking, and other raw computing resources, as well as services and tools that can be used to develop, test, run and manage applications in the cloud.

A2.6   Cloud services are an essential input for services across the digital communications value chain – as well as for services less related to communications, like manufacturing, retail, hospitality and financial services. Indeed nearly all online services 'run' on cloud services – whether self-provided or provided by third parties such as Amazon's AWS.

A2.7   Cloud services and connectivity services are becoming increasingly interlinked:

a) cloud providers work with multiple connectivity providers to ensure that data can flow between end-users and cloud-hosted services, and some cloud providers offer access to CDNs [21] and connectivity services like subsea networks;

b) telecoms operators are beginning to use cloud computing to operate their networks by migrating their virtualised network functions to the cloud. Although today this is mostly through self-provided ('private') cloud infrastructure, there are also early examples of telecoms operators relying on third-party cloud providers. [22] Cloud providers are also starting to offer virtualised network functions in competition with traditional vendors like Ericsson and Nokia; [23]

c) MNOs are also starting to deploy Edge Cloud infrastructure for multi-access edge computing supporting retail services (as opposed to virtualisd network functions) and some are choosing to partner with hyperscalers to do so; [24] and

d) cloud providers are beginning to offer last-mile networks to industrial clients using private 5G mobile networks, [25] in competition with traditional mobile operators.

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[21] E.g. Amazon's CloudFront or Google's Cloud CDN

[22] In the US, the new (fourth) MNO, DISH, has entered into a strategic partnership with Amazon Web Services to provide a cloud-based network, Amazon, DISH and AWS Form Strategic Collaboration, April 2021. In addition, the biggest existing MNO, AT&T, has moved its 5G core to Microsoft Azure after Microsoft acquired AT&T's network cloud business. Microsoft, AT&T to move its 5G mobile network to the Microsoft Cloud, June 2021.

[23] For example, Microsoft has recently acquired two companies that supply VNFs - Affirmed Networks and Metaswitch Networks (See Microsoft announces agreement to acquire Affirmed Networks to deliver new opportunities for a global 5G ecosystem - The Official Microsoft Blog and Microsoft announces definitive agreement to acquire Metaswitch Networks, expanding approach to empower operators and partner with network equipment providers to deliver on promise of 5G - The Official Microsoft Blog).

[24] 4 For example, in June 2021, AWS and Vodafone made their MEC infrastructure available to mobile users in London. See Announcing general availability of AWS Wavelength in London, June 2021.

[25] See AWS Private 5G.

Other wholesale inputs

Figure 9: Focused view on wholesale inputs within the high level value chain
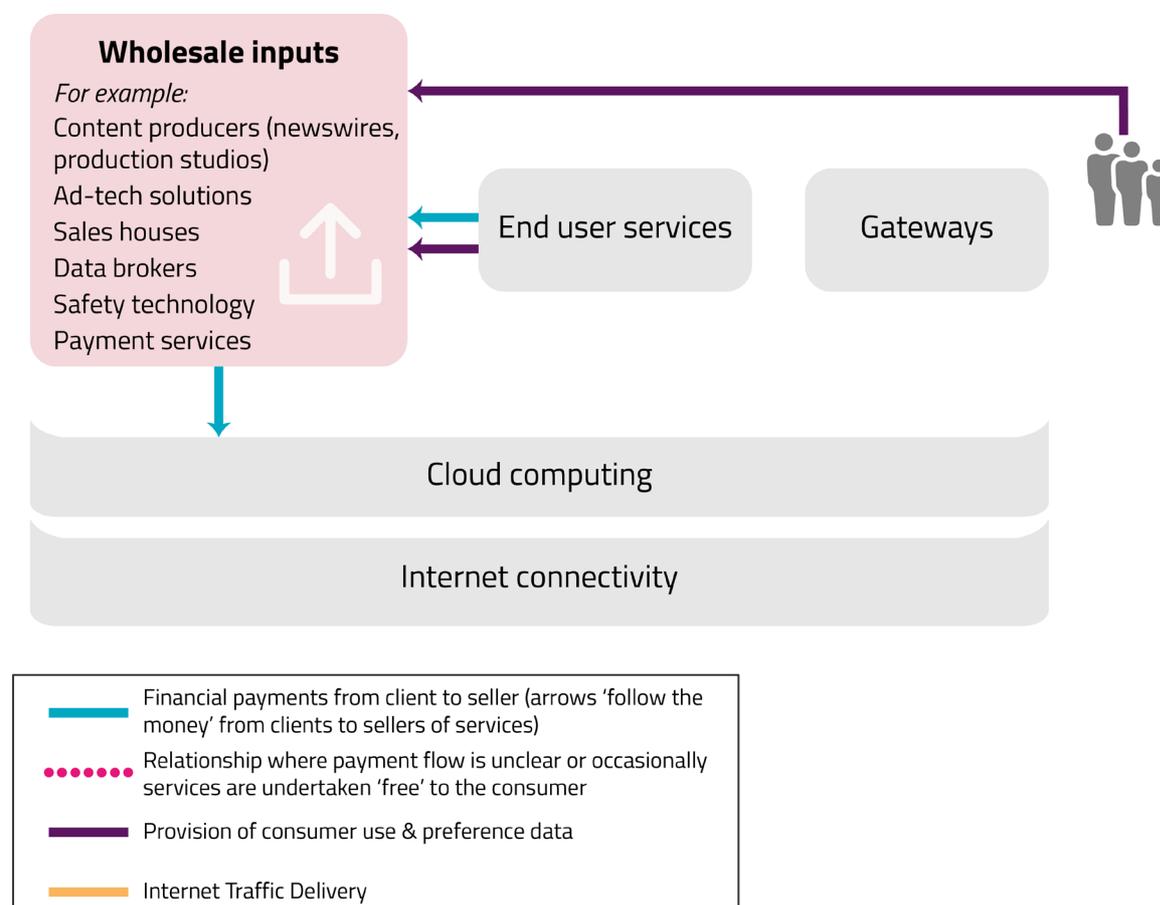
A2.8   Providers of end-user services often rely on a range of inputs (in addition to cloud computing and connectivity) which they usually purchase on a wholesale basis from third parties. This includes, among other things:

a)   **content,** such as the TV programmes that Netflix or the BBC commission or license;

b)   **payment processing services**, such as PayPal, allowing service providers to bill consumers;

c)   **advertising-related services**, including online 'ad tech' solutions, sales houses, data brokerages, etc, allowing providers of end-user services to sell and show advertising. This accounts for a significant share of their funding; and

d)   **safety-tech**, helping certain end-user services, such as social media, to protect end-users from harmful content and other harms.

A2.9   This is a heterogeneous category of products and services, and many are not specific to communications-related use cases. These wholesale inputs can also at times be relevant to both traditional and online services (e.g. most TV programmes can be shown both through traditional and online TV services).

A2.10   Safety-tech will likely play a key role in the delivery of outcomes important to Ofcom's duties in relation to online safety as well as network security and resilience. Relevant activitiess include:

a) **Harmful content detection** – supporting service providers' efforts to moderate user-generated content

b) **Age verification** – allowing service providers to make sure that underage users do not access unsuitable services or content

c) **Privacy protection** – services which protect personal data and other data assets, including encryption

d) **Consumer protection** – services which can identify and moderate harmful content, disrupt action by bad actors or enable children to access age-appropriate content

e) **Security** – services that protect key data and systems, including anti-malware, anti-virus and anti-hacking processes and software.