Ofcom
making communications work
for everyone

The future of fixed telephone services

Policy positioning statement

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Annex

1. Overview

The UK's telecoms networks will undergo substantial change in the coming years, as the companies that run them upgrade their technology. Some phone companies are already gradually moving their landline customers from the country's traditional telephone network – the 'public switched telephone network' (PSTN) – to newer digital technology known as 'voice over internet protocol' (VoIP), which carries calls over a broadband connection.

The change will offer potential benefits to consumers, such as clearer phone calls, and it will help ensure the UK's landline telephone services are fit for the future. The transition will be straightforward for most customers. However, some who rely on services such as security alarms and telecare devices, and those who have only a landline telephone service, may require additional support to help them update their services.

Although this change is being led by the broadband and phone companies, a number of organisations, including Ofcom, have a role to play in making sure customers experience minimal disruption and are protected from harm. Ofcom's rules mean that phone users must receive equivalent protections, however their landline is delivered. However, the migration also presents an opportunity for us to think about how we regulate telephone services to meet customers' changing expectations and needs.

In this document, we have explained what changes are taking place, the roles and responsibilities of different organisations, and our expectations of telecoms providers as they make these changes. In doing so, we aim to provide a clear understanding of Ofcom's role, the breadth of related work we are carrying out, and an overview of when we will be working with other organisations on particular issues.

Ofcom's strategy is to encourage investment and promote competition in fibre broadband networks, which are replacing older copper wires. At the same time, we must ensure consumers are protected from harm.

While switching to phone calls over broadband will be vital to the successful transition from the copper network, these are two distinct activities. However, the expectations we set out may also apply in part to the growth in fibre networks, particularly for customers who opt to take up fibre services ahead of the withdrawal of the PSTN.

Background

1.1 Historically, most landline telephone services have been delivered over the PSTN. The PSTN has been in place for many decades and generally includes copper wires, and equipment dedicated to supporting call services. Over the last decade, however, telecoms companies have built modern internet protocol (IP) based networks which can support both broadband and landline telephone services. While some providers have maintained two separate networks – the PSTN for call services and a separate IP network for broadband – others have replaced the PSTN and carried phone calls over broadband. To date, these

changes have been largely invisible to customers, as providers have not upgraded all parts of their networks or have chosen to emulate how traditional call services work in customers' homes.

1.2 Customers can already choose to use VoIP, which uses a broadband connection to make calls. For example, services such as Skype and Vonage have been available for a number of years, and many businesses already use VoIP services.

1.3 During the next few years these broadband-based call services will become more common, as the PSTN is reaching the end of its life and becoming increasingly difficult and costly to maintain. Major landline providers will offer VoIP products delivered over broadband to their residential customers before the PSTN is retired completely.

1.4 This has been prompted by Openreach's announcement that it will withdraw its Wholesale Line Rental (WLR) products that rely on the BT PSTN by 2025.[1] As a result, over 16 million telephone lines that use Openreach's wholesale call products will be transferred to IP-based networks which support broadband-based call services. Similarly, Virgin Media intends to retire its PSTN over the next few years and currently anticipates completing its switch to IP in line with Openreach's timescales.

1.5 The nature of this change means it will take a number of years to complete. It is industry-led, and decisions to retire the PSTN lie with the companies. This means that the switch to phone calls over broadband will be undertaken by different companies, at different times, and in different locations depending on their plans.

1.6 This change is not unique to the UK and a number of countries around the world have completed, or are in the process of, a similar transition.[2]

Market context

1.7 The way in which people in the UK make phone calls has changed substantially over the last decade. While landline call services are still prevalent – around eight in ten UK households (81%) have a landline service[3] – most consumers now own a mobile and use this as their main method for making and receiving calls in the home.[4] Our research shows that the volume of mobile calls in the UK has increased steadily in recent years, from 132.1

[1] See https://www.openreach.co.uk/orpg/home/products/wlrwithdrawal/wlrwithdrawal.do.
[2] The Broadband Stakeholder Group recently published a report entitled *Preparing the UK for an All-IP future: experiences from other countries* which outlines the approach taken and experiences to date of four countries (France, Germany, New Zealand and Switzerland) migrating their services (http://www.broadbanduk.org/wp-content/uploads/2018/12/Plum-BSG-Preparing-the-UK-for-all-IP.pdf).
[3] Ofcom Technology Tracker H1 2018. See Ofcom, 2018. *Communications Market Report*, p.11. https://www.ofcom.org.uk/__data/assets/pdf_file/0022/117256/CMR-2018-narrative-report.pdf.
[4] Ofcom survey data from 2017 suggests that 67% of those with a personal mobile and a landline see their mobile as the main method for making and receiving calls in the home (Ofcom, 2017. *Phone Use in the Home Survey*. https://www.ofcom.org.uk/__data/assets/pdf_file/0016/114217/phone-use-home-survey.pdf).

billion minutes in 2012 to 151.4 billion in 2017[5], while landline call volumes nearly halved in the same period, falling from 103.1 billion minutes to 53.6 billion.[6]

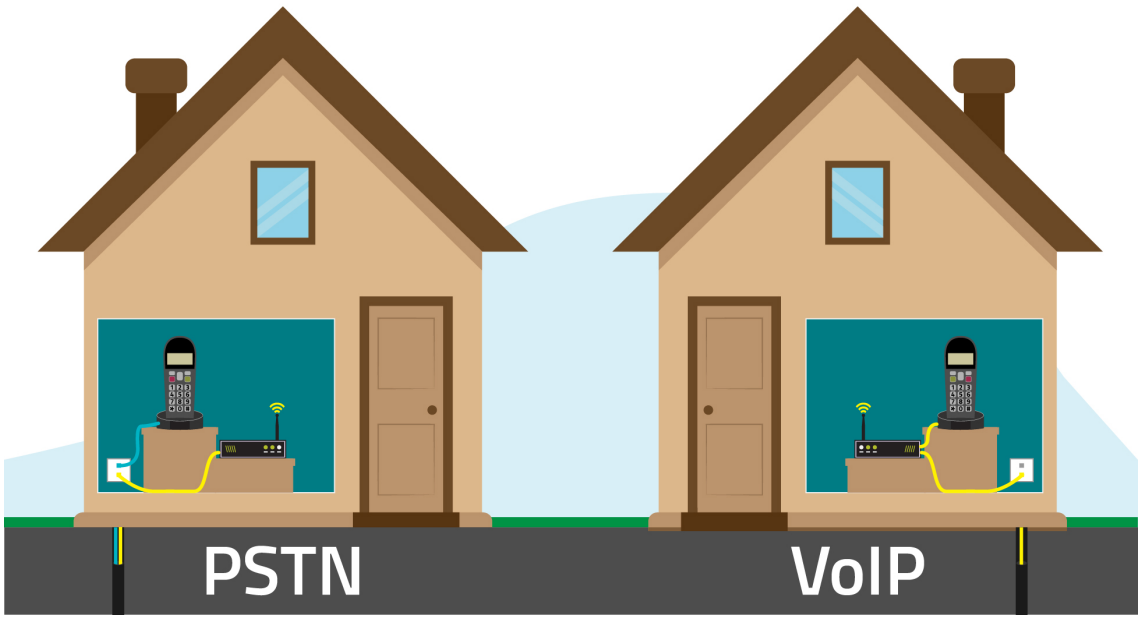
1.8 Despite this decline, many people still depend on their landline, such as those who do not own a mobile phone. Our research suggests that 4% of UK adults live in a home with a landline and no mobile phone.[7]

1.9 Our research also indicates that while there has been a steady increase in the take-up of fixed broadband in the UK[8], 3% of households have only a landline – without any broadband.[9]

Impact on customers

1.10 We understand that most providers intend to invite their customers to upgrade to new VoIP-based services on a voluntary basis. This could offer benefits to customers, such as clearer phone calls.

1.11 For most customers, switching to VoIP should be straightforward and they will continue to receive what they recognise as a traditional phone service. While all landline customers will eventually need a broadband connection to continue receiving a phone service, they will still have the same phone number and use phone numbers to make and receive calls. For many, the only change they will need to make will be to connect their existing handset to a different socket.



[5] Ofcom/Operators. Note: includes estimates where Ofcom does not receive data from operators. See Ofcom, 2019. *Telecommunications Market Data Update Q3 2018*, https://www.ofcom.org.uk/__data/assets/file/0021/135192/Q3-2018-Telecoms-Data-Update.csv.
[6] Ofcom/Operators. See *Telecommunications Market Data Update Q3 2018*.
[7] Ofcom Technology Tracker H1 2018.
[8] See Ofcom, 2018. *Communications Market Report*, p.11.
[9] Ofcom Technology Tracker H1 2018.

1.12 Some final migrations may need to be compulsory, with sufficient warning, to ensure all customers are moved from the relevant networks prior to the final switch-off deadline. Regardless of whether they are voluntarily or compulsorily migrated, some customers, particularly those who are elderly, need a new broadband connection or have accessibility or disability requirements, may need additional support during the change.

1.13 The migration will also impact services – such as security and fire alarms, telecare devices, retail payment terminals and equipment for monitoring and controlling networks – which rely on some attributes of the PSTN that may not be fully replicated in VoIP-based platforms. This could have implications for both domestic and business customers, as well as public sector users, including some organisations delivering critical national infrastructure. A carefully managed transition will be vital to ensure people experience as little disruption as possible and are protected from harm.

Regulatory policy considerations

1.14 Migration to VoIP is part of a wider change in technology and the market. This change creates challenges for providers and telephone services, but also opportunities: for example, to help identify and prevent nuisance calls and to improve the quality of voice services.

1.15 Regulation also has a role to play. Our aims are to promote competition between providers, maintain confidence in call services and protect customers from harm. We are reviewing regulation on the use and management of phone numbers and of the interconnection arrangements between networks.

Scope of this document

1.16 While the decision to switch off the PSTN is led by broadband and phone companies, and they are responsible for ensuring a smooth transition for both their retail and wholesale customers, switching to calls over broadband is a wide-ranging change that will affect a number of organisations. Many of these have a role to play in making sure this change is successful and minimising the risk of harm.

1.17 Section 2 describes the roles of different organisations, and Ofcom, in relation to the migration. In particular, it sets out our expectations of the measures providers should take to ensure customers are not harmed. Section 3 discusses the policy opportunities the migration presents, and the areas where Ofcom is considering regulatory changes to create the conditions required to ensure minimum disruption. Finally, Section 4 includes more information about how telecoms companies and other interested parties can engage with Ofcom, and each other, in relation to different aspects of the programme of work set out in this document.

2. Consumer migration to VoIP

2.1 In this section, we discuss the different organisations that we consider have a role to play to ensure that the migration is successful and the work that some of them have carried out to date to support it. We also set out in more detail the issues that communications providers need to take into account when migrating their customers, including our expectations of the measures they should put in place to ensure they protect their customers from undue disruption.

Ofcom

2.2 We recognise that the migration to VoIP is necessary to ensure the continued provision of reliable landline telephone services given that the PSTN can no longer be sustained in the long term.

2.3 Ofcom is supportive of a well-managed migration and the opportunities it presents to deliver future-proofed services that better meet the needs of customers. The change will offer potential benefits to consumers, such as clearer phone calls and the choice to have broadband provided separately from the telephone service. However, it is important that disruption to landline voice customers, both business and residential, is minimised. Wherever possible, our preference is for voluntary-led migration, where customers actively choose to adopt a new VoIP service, as opposed to being compelled to move as a migration deadline approaches.

2.4 While the decision to migrate telephone services to IP has been led by industry, Ofcom has a role to play throughout the migration process to help ensure that customers are not subject to undue disruption, including by facilitating co-ordination between providers, and to ensure that competition continues to deliver efficiency and innovation.

2.5 We have been working closely with providers to consider the issues that will be raised by the migration, monitor their migration plans and provide clarity regarding our expectations of how they communicate with, and support, customers and downstream service providers during the migration process.

2.6 We are also working with communications providers, government departments and other regulators to ensure that downstream service providers, equipment manufacturers and key business users that rely on the PSTN are aware of the changes so that the services can be upgraded or replaced if necessary and continue to work post migration. As part of this, Ofcom has convened two All IP Working Groups; the first – the Technical All IP Working Group – relates to technical issues and enables members to share information about the migration and discuss any emerging issues, and the second – the Communications All IP Working Group – enables members to share information and best practice about consumer communications relating to the migration. These groups aim to share information and facilitate collaboration between communications providers, downstream service providers and other stakeholders including Government. (Further details about these groups and plans for their evolution are set out in Section 4).

2.7 As communications providers' migration plans progress, we will continue to work with them and with downstream service providers and consumer groups to understand the needs of vulnerable consumers in particular and to ensure that critical services continue to work following migration.

Downstream service providers and users

2.8 Several other bodies will have a role to play in ensuring the migration is completed successfully. Most notably, these include downstream service providers that offer services such as telecare and burglar alarms, payment terminals and monitoring systems, that rely on some of the technical characteristics of the PSTN. These service providers will need to test their equipment to see if it will continue to function over IP and then replace, upgrade or reconfigure it as appropriate. They also need to make sure that their customers (which range from residential users to large commercial and public sector entities) are aware of the issue and take any necessary steps to maintain their service(s).

2.9 Government is also working to ensure that the sectors that utilise downstream services, including health, energy, transport and business, are aware of the change and prepare accordingly. The Department for Digital, Culture, Media and Sport (DCMS), with support from Ofcom, is working on cross-departmental engagement in order to ensure government departments are aware of, and prepared for, the change and its effects on industry and public service sectors they sponsor.

2.10 Finally, downstream service users will need to act on the information provided by their downstream service and communications providers to ensure their services continue to work once they can no longer utilise the PSTN. As the migration progresses and more customers are transitioned to VoIP services, we anticipate that consumer bodies will have a role to play in helping to disseminate information about the change and provide advice to consumers regarding the steps they need to take and support they will be offered if they are migrated.

Communications providers

2.11 As noted above, we expect communications providers to ensure that the transition runs smoothly for their customers. In this section, we describe some key issues that providers need to take into account when migrating their customers to All IP networks. We also state our expectations around how they will communicate with, and provide support to, their customers to ensure that migration delivers good outcomes for them, and that there are adequate protections in place for those that are at greater risk of harm. These include our expectations in relation to:

- working with downstream service providers;
- supporting migrating customers;
- Ofcom's guidance on access to emergency services; and
- the continued availability of landline telephone services.

2.12 We welcome the fact that a number of providers are already considering these issues and how best to communicate with, and protect, their customers. We are aware that some have taken steps to identify services and sectors that are likely to be impacted by the migration and alert them to the change. BT has a dedicated 'Special Services engagement team' to raise awareness of the BT All IP programme and has opened testing facilities for downstream service providers to see if their equipment will continue to work effectively over VoIP.[10] As part of their engagement work, representatives from BT and Virgin Media have presented at trade events and conferences to raise awareness within affected sectors. In addition, processes are being developed to ensure a customer's PSTN connection can be restored if they are migrated and critical services that rely on the PSTN no longer function correctly.

Our expectations of communications providers

2.13 In Ofcom's Connected Nations reports 2016 and 2017, we set out a series of 'consumer protection principles[11]' that we would apply during migration to mitigate the risk of bad outcomes for consumers and businesses. The expectations of industry that we have set out below in relation to downstream service providers and supporting migrating customers build on these principles.

2.14 In the majority of cases, a communications provider will not be aware of the specific downstream services that are being run over their network and so will not have a record, or full understanding, of all the services that may be impacted by the switch-off or how extensive the impact will be. However, given the critical nature of some of the services that rely on the PSTN, we consider that communications providers should engage with key downstream service providers to help them understand and prepare for the change to ensure the transition is as smooth as possible and to mitigate the risk of any consumer harm.

2.15 As explained above, for most consumers the migration from the PSTN to VoIP services should be straightforward and simply entail connecting their telephone to their broadband router instead of the wall socket. The move to VoIP may, however, be more complex for consumers that have downstream services such as telecare devices and security alarms that rely on the PSTN. In addition, some customers, such as landline-only customers, or those with a visual impairment or mobility issue, may require support from their provider when installing or using new equipment.

2.16 Ofcom has met with a range of stakeholders, including communications providers, consumer bodies and representatives from downstream service providers, to establish a common understanding of the challenges likely to be faced by customers and downstream

[10] See: https://btplc.com/DigitalServicesLab/index.htm.
[11] See Ofcom, 2016. *Connected Nations*, p.69. https://www.ofcom.org.uk/__data/assets/pdf_file/0035/95876/CN-Report-2016.pdf, and Ofcom, 2017. *Connected Nations: Data Analysis*, p.71-72. https://www.ofcom.org.uk/__data/assets/pdf_file/0016/108511/connected-nations-2017.pdf.

service providers, and to develop some good practice principles for communications providers to follow during the migration.

2.17 Our expectations developed from these stakeholder discussions are set out below. These are separated into two groups; those setting out our expectations of how communications providers should work with downstream service providers, and our expectations of the support that they should provide to customers during the migration process.

2.18 These are intended to apply to providers who are migrating customers both voluntarily and compulsorily, and both residential and business customers. These expectations are likely to evolve as providers learn from their experiences of rolling out VoIP services and we will continue to engage with stakeholders to develop more detailed examples of good practice around them.

2.19 At a minimum, we consider that communications providers, either directly, or, where relevant, via their trade association, should:

Downstream services

- Share knowledge of the key downstream services impacted by the migration and examples of good practice/successful communication strategies, for example, by participating in Ofcom's and industry's All IP Working Groups;
- Develop a strategy to identify and engage with downstream service providers that utilise their landline services, in a timely fashion, to ensure they are aware of the change and the potential implications;
- Where relevant, make downstream service providers aware of any available testing facilities or facilitate access to the facilities offered by access network providers, so they can determine whether their services will work effectively over an IP network;
- Identify customers who use critical downstream services (such as a telecare device), develop appropriate communications plans and put in extra protection measures. For example, this could include delaying a customer's migration until satisfied that their downstream service is compatible with VoIP;
- Develop effective processes to support customers who inform them that their downstream services do not function as planned after migration. This could include returning them to a PSTN service if it remains available where the failure creates a risk of significant harm.

Supporting migrating customers

- Give adequate notice of service changes, noting that both residential and business customers may need time to acquire and configure new equipment;
- Ensure that all communications regarding the migration are clear and timely, in a format that reflects the needs of the customer, and include information about the potential impact on equipment that uses the PSTN;
- Assess customers' needs and offer help with migration (for example, a home visit to install a router) if necessary;
- Offer advice and assistance for all migrating customers, including those who use downstream services, and co-operate with providers of these services, to minimise disruption;
- Put ongoing protections in place to respond appropriately to later changes in end-users' circumstances, for example, customers that migrate to a VoIP service and then purchase a security alarm or telecare device.

Guidance on access to emergency services

2.20 An important function of the telephone network is to allow people to contact the emergency services. For this reason, Ofcom requires communications providers to take all necessary measures to ensure uninterrupted access to emergency organisations for their customers.[12]

2.21 Traditional voice calls over the PSTN are delivered to premises via copper wire connections and, as these lines are powered from the local telephone exchange, emergency calls can be made in the event of a power cut at the premise. In contrast, calls made over broadband using VoIP-based technology will not function in a power cut unless additional measures are in place, as the broadband equipment at the premise requires mains power to work.

2.22 In October 2018, following consultation, we published guidance on how providers can continue to meet their obligation to ensure uninterrupted access to emergency organisations during a power outage for those customers using VoIP technology.[13] The guidance sets out four principles that we consider, if followed, are likely to mean that a provider is meeting their obligation.

2.23 In summary, the principles state that:

- Providers should have at least one solution available that enables access to emergency services for a minimum of one hour in the event of a power outage in the premises;

[12] General Condition A3.2(b) places a regulatory obligation on providers of a Publicly Available Telephone Service (PATS), and/or a Public Electronic Communications Network (PECN) over which a PATS is provided, to take all necessary measures to ensure uninterrupted access to emergency organisations as part of any PATS offered. See the revised General Conditions of Entitlement: https://www.ofcom.org.uk/__data/assets/pdf_file/0021/112692/Consolidated-General-Conditions.pdf.

[13] See Ofcom, 2018. *Protecting access to emergency organisations when there is a power cut at the customer's premises: Guidance on General Condition A3.2(b).* https://www.ofcom.org.uk/__data/assets/pdf_file/0016/123118/guidance-emergency-access-power-cut.pdf.

- The solution should be suitable for customers' needs and should be offered free of charge to those who are at risk as they are dependent on their landline;
- Providers should i) take steps to identify at risk customers and ii) engage in effective communications to ensure all customers understand the risk and eligibility criteria and can request the protection solution; and
- Providers should have a process to ensure that customers who move to a new house or whose circumstances change are aware of the risk and protection solution available.

2.24 The full guidance which sets out Ofcom's expectations in relation to each principle in turn can be found on the Ofcom website at https://www.ofcom.org.uk/consultations-and-statements/category-2/access-emergency-organisations-power-cut.

2.25 Given the guidance relates to a General Condition that was already in place, it applied immediately upon publication.

Availability of telephone services

2.26 Current landline telephone customers that utilise services that rely on the PSTN will require a broadband connection if they still wish to receive a landline telephone service on migration to VoIP. We note that some landline-only customers currently live in areas without reliable broadband coverage. However, in March 2018 the Government introduced legislation for a broadband universal service obligation (USO), which will give eligible homes and businesses the right to request a decent broadband connection by 2020. Ofcom is now responsible for the implementation of the USO.[14] In addition, currently both BT and KCOM are designated as universal service providers for landline telephone services which means they need to supply a voice connection upon reasonable request and ensure that uniform pricing is adopted for all USO customers.

2.27 We will be working with the USO providers to understand how they plan to continue to meet their obligations.

Next steps

2.28 We will continue to work with providers to monitor their migration plans. As part of that monitoring we want to understand:

- how they have taken the above expectations into account when formalising their plans and any learnings from their engagement with customers;
- their interaction with downstream service providers, including the sectors they have engaged with and an overview of any testing results; and
- the measures they have put in place in response to our guidance on ensuring access to the emergency services.

2.29 Where relevant, we also expect voice USO providers to be able to explain the plans they have in place to ensure they will continue to meet their obligations.

[14] See https://www.ofcom.org.uk/phones-telecoms-and-internet/advice-for-consumers/broadband-uso-need-to-know.

2.30 To help us monitor how the migration is progressing, we will ask communications providers to supply data to us as they begin to launch their commercial VoIP products. The data of interest to us is likely to evolve as voluntary migration progresses to compulsory migration, and the volume of customers using VoIP services increases. At a minimum, however, we expect providers to share information regarding the take-up of VoIP services, how many complaints they have received relating to migration and an analysis of the key themes raised, and quality of service metrics for their VoIP products.

2.31 We will also continue to monitor any complaints Ofcom receives about customers' migration experiences, including their interaction with providers, the support they are offered, and the protection solutions they are offered to ensure they have uninterrupted access to the emergency services. We will address any significant concerns identified through Ofcom's complaints data, or the data supplied by communications providers, with providers directly and through formal enforcement action where appropriate.

2.32 The above sets out our current approach when engaging with industry and other stakeholders, and our expectations of the actions that providers should take. We will keep this under review as the migration proceeds to see if further measures need to be taken to improve customer awareness and outcomes, and co-ordination between stakeholders.

3. Regulatory policy considerations

3.1 Migration to VoIP is part of a wider change in technology and the market. This change has led to challenges for providers and telephony services, but it also creates opportunities: for example, to help identify and prevent nuisance calls and to improve the quality of voice services.

3.2 Regulation also has a role to play. This section sets out how we are reviewing regulation on the use and management of phone numbers and of the interconnection arrangements between networks. The aims of this review include:

- **Promoting competition between providers** of telephony services, recognising the changing market environment, where over-the-top (OTT), social media and messaging platforms offer alternatives to telephony and increasingly, through services such as 'Skype to Phone', provide access to telephony in competition to traditional telephony providers.
- **Promoting consumer confidence in telephony** by tackling nuisance and scam calls and addressing pricing practises that lead to unexpected or excessive bills.
- **Protecting consumers from harm** by making sure they continue to have access to important services.

3.3 We plan to publish a suite of documents in the Spring, seeking stakeholder views on the shape of regulation of voice in the future.

Telephone number management

3.4 Telephone numbers will remain a key means by which consumers will identify called and calling parties. However, nuisance and scam calls have become a widespread problem. Trust and confidence in using voice services may be diminished if customers become more vulnerable to fraud and nuisance calls.

3.5 New rules about the use of private information have sought to address this, but those rules do not prevent unscrupulous companies from hiding their identity by spoofing the telephone number presented to the called party and network ('Caller ID'). As rules and technology evolve to put in new barriers to these abuses, those making nuisance and scam calls seek out new ways to get around them.

3.6 A key challenge to be addressed is the absence of a solution to verify the authenticity of the Caller ID and, hence, the actual origin of a VoIP call and rights to use that number.

3.7 The move to an All IP environment also provides an opportunity to update the UK's legacy systems and processes for allowing consumers to keep their telephone numbers when switching providers ('number portability'). Number portability makes it easier for customers to change their provider which, in turn, sustains effective competition.

3.8 The move to IP also provides the opportunity for us to consider more generally how we manage telephone numbers, what consumers and businesses understand and need from telephone numbers and how they should be used in the future.

Future use of numbers

3.9 Telephone numbers will continue to have an important role in electronic communications for many years to come, however their function will evolve. We need to look at what customers understand, want and need from telephone numbers going forward.

3.10 Our national telephone numbering plan, like those around the world, has been shaped by the development of the PSTN.[15] But, in the future, the evolution of telephony services may make the distinction between telephone numbers used for landlines and those for calling mobiles blur and have less meaning to customers.

3.11 Call prices have also become much simpler. The cost of a landline call used to depend on distance; calls to and from a mobile were typically much more expensive. Now most calls, both from landlines and from post-paid mobile, are included in call allowances. However, when calls are charged for, this can lead to unexpected or excessive bills. As the UK's numbering plan is designed to inform on service and/or call cost, we need to consider how it, and associated regulation, might need to evolve to continue to provide this information accurately to customers and ensure compliance.

3.12 More specifically, we are considering whether location significance should be preserved in geographic numbers. Currently the UK is divided into 610 area codes, which is a consequence of the PSTN.[16] Migration to IP makes this redundant from a technical perspective. However, location significance may continue to have value for consumers and businesses, so we need to consider whether it would be appropriate to retain area codes.

3.13 Also, we recognise that the dynamics of service provision have changed significantly since the introduction of non-geographic number ranges such as 084 and 087, where the concept of sharing the cost of provision between the caller and service provider was established. The price of phone calls has reduced considerably with most calls now made from call allowances without additional call charges. There are also now many alternatives to telephony for micropayments. We therefore need to look at the future role of non-geographic numbers as a form of micropayment for provision of telephony services.

3.14 Furthermore, we need to consider if any new services might benefit from being identifiable in the numbering plan.

[15] For example, geographic telephone numbers (which today begin with 01 or 02) where the first few digits relate to a UK area, were originally devised to allow a subscriber to automatically 'trunk dial' without needing a human operator to connect their national call. So, from the 1950s, a subscriber could dial a geographic telephone number to automatically instruct their local telephone exchange (say in Bristol) to switch them to a subscriber connected to a different telephone exchange (say in Glasgow).

[16] See footnote 15.

Interconnection and termination

3.15 Interconnection arrangements between providers underpin the commercial and technical practicalities of connecting telephone networks. Migration to VoIP could result in far simpler interconnection between fixed networks and make it more likely that providers will compete to offer transit services to, or from, smaller providers.

3.16 In the future, as landline and mobile voice services converge both in terms of how they are delivered and how customers use the services, the justification for different pricing of wholesale fixed and mobile call termination may erode. Equally, an aspect that we might need to consider in reviewing our approach to wholesale pricing is the effect of competition from other platforms not subject to the same open access and interconnection rules.

Next steps

3.17 We plan to publish separate 'call for input' documents in Spring 2019 to cover:

- **Number management.** We will discuss some of the available options for implementing a strategic numbering solution, including some new proof of concept work we have been doing with industry using blockchain technology.[17] We will seek views about these options and invite other suggestions from stakeholders.
- **Future use of numbers.** We will seek views on potential changes to the use of and obligations associated with different number ranges.
- **Interconnection and call termination.** We will discuss and seek views about options for regulation of interconnection and call termination during the period of migration to VoIP on fixed networks and in the longer term, and on the rules that apply in relation to end-to-end connectivity. We envisage any proposed changes in regulation to be considered in future market reviews and implemented from 2021.

[17] See Ofcom's media release at: https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/blockchain-technology-uk-telephone-numbers.

4. Stakeholder engagement

4.1 There are a number of industry groups, some convened by Ofcom, that providers may wish to engage with in relation to the migration of telephony services to IP. This section provides more information about these bodies, their respective remits and how they relate to and interact with Ofcom.

Ofcom All IP Working Groups

4.2 Since 2017 Ofcom has convened two All IP Working Groups – a Technical Working Group and a Communications Working Group – to consider issues being raised by the migration to VoIP. In addition to the wide range of industry stakeholders at these meetings, DCMS also attends regularly to keep up-to-date with developments.

Technical Working Group

4.3 The Technical Group meets quarterly and aims to facilitate collaboration between communications providers, providers of downstream services that use the PSTN and other interested organisations. Members share information about technical issues around the migration and highlight resulting issues. Topics discussed include:

- providers' migration plans and timetables;
- work by the NICC to develop new, and update existing, standards to support new All IP voice networks (see paragraphs 4.10 – 4.12); and
- the implications for downstream services.

Communications Working Group

4.4 The objective of the Communications Group is to enable members to share information and best practice about consumer communications relating to the migration to IP. Topics discussed include the scope for developing common terminology and challenges faced by providers migrating consumers to VoIP services to date.[18]

Other Ofcom Working Groups

4.5 As the work described in Section 3 evolves, further Ofcom-led working groups may be set up as appropriate.

Office of the Telecommunications Adjudicator (OTA2)

4.6 The OTA2[19] is an independent body that seeks to implement processes that enable competitors to access Openreach products on an equivalent basis to that enjoyed by BT. It

[18] The Broadband Stakeholder Group (see: http://www.broadbanduk.org) is also considering initiatives in this area.
[19] See: http://www.offta.org.uk/index.htm.

also ensures that these processes are fit for purpose and deliver an acceptable quality of consumer experience.

4.7 The OTA2 has developed a variety of working groups covering Openreach's product lines. These comprise of representatives from interested parties across industry whose aim is to review product changes and performance and address any issues. It seeks to do this by mediating between Openreach and its customers and avoiding unnecessary disputes being raised with Ofcom.

4.8 In relation to the migration to VoIP the OTA2:

- Is developing a new industry programme aimed at pre-validating the migration processes which gaining providers will be using to support the increased demand from end users migrating from PSTN to VoIP;
- Has developed a new Code of Practice for restoring end users' 'special services' if they have ceased to work post migration to VoIP;
- Is supporting Openreach to deliver its WLR withdrawal plans; the OTA2 co-own all the WLR work programmes listed below.

4.9 The OTA2 also convenes the Number Port Executive Steering Group[20] and is a member of the Ofcom Technical All IP Working Group and regularly provides updates regarding its work in relation to the migration.

NICC

4.10 NICC[21] is a technical forum for the UK communications sector that develops interoperability standards for the public electronic communications networks and services in the UK. It is an independent organisation owned and run by its members, of which there are three membership classes – Full (open to all telecommunications providers and organisations with an operating presence or other interest in the UK and the equipment supplier community), Associate (similar to Full membership but unable to attend board meetings and do not have voting rights on NICC standards) and Observer (currently Ofcom and DCMS – can attend board meetings in a non-voting capacity).

4.11 NICC currently has a number of working groups involved in issues related to the migration to VoIP including developing new and updating existing standards to support the new All IP network and access environment.

4.12 NICC member organisations are members of the Ofcom Technical All IP Working Group and regularly provide updates regarding the All IP Task Group's work.

[20] Comprising representatives from the landline number porting stakeholder community who oversee business rules and processes for porting geographic and non-geographic numbers excluding mobile.
[21] See http://www.niccstandards.org.uk/.

Openreach WLR withdrawal working groups

4.13 With the support of the OTA2, Openreach has set up a number of working group sessions on key themes around the withdrawal of WLR and the development of the Single Order Transitional Access Product (SOTAP). These are open to all providers and industry groups[22] and include:

- White Label Communications
- Resellers
- SOTAP Product Development
- Stop Sell: WLR, Shared Metallic Path Facility (SMPF), Sub Loop Unbundling SMPF
- WLR Withdrawal Trials
- Special Services Testing and Critical National Infrastructure (CNI)
- Migrations Management
- Management Information System (MIS) Reporting
- Managing Orphaned End Customers

4.14 We regularly meet with Openreach on a bi-lateral basis. It is also a member of our All IP Working Groups and provides regular updates regarding its WLR withdrawal plans. We will continue to monitor the progress of the above working group sessions as Openreach's withdrawal plans progress to ensure that the interests of both Openreach's retail customers and end users are protected.

All IP programme overview: new Steering Group

4.15 To help communications providers stay informed of this extensive programme of policy and implementation work underway to support the migration to VoIP, Ofcom is establishing an All IP Steering Group to meet on a quarterly basis, alongside technical and communications working groups. This will act as an umbrella body (with members including communications providers, OTA2, NICC and DCMS) to provide updates on the overall programme of work and will help providers direct issues raised to the relevant Ofcom, OTA2 and Openreach groups. As the Steering Group is expected to cover some of the issues that the Technical Working Group has considered to date, we propose that the Technical Working Group evolve to focus primarily on downstream services.

4.16 A diagram showing the evolving structure is set out in Annex 1.

Engagement with Government and public bodies

4.17 Given the potential implications for downstream services using the PSTN, Government has a key role to play in helping to ensure that the sectors that use such services, including health, energy, transport and business, are aware of the change and prepare accordingly.

[22] Information about the working groups and content generally around WLR withdrawal can be found on the Openreach web page: https://www.openreach.co.uk/orpg/home/products/wlrwithdrawal/wlrwithdrawal.do.

Ofcom will continue to support DCMS and governments in the nations with cross-departmental engagement. Updates on this engagement will be provided to the All IP Steering Group.

4.18 In addition, telecoms companies that provide services to Government and other public bodies will be contacting them to communicate details of any changes to those services.

Communicating with Ofcom

4.19 If stakeholders have any comments or queries relating to any aspects of this document or are interested in joining the Ofcom All IP Steering Group, then they should contact us at futureofvoice@ofcom.org.uk.

A1. All IP Steering Group and Working Groups

A1.1 The chart below illustrates the envisaged structure of working groups run by Ofcom, OTA2 and Openreach – as described in Section 4.