



هيئة تنظيم الاتصالات  
Telecommunications Regulatory Authority  
Kingdom of Bahrain - مملكة البحرين

**Position Paper**  
**published by the Telecommunications Regulatory Authority**  
**of the Kingdom of Bahrain**  
**on Internet and Online Applications**

**6<sup>th</sup> October 2016**

**Ref: LAD/1016/184**

**Purpose:** To set out the TRA's view in relation to the evolution of the Internet and of online applications, particularly with regards to the relationship between OTT players and telecommunications operators (rectius, "Licenced Operators" as defined under the Telecommunications Law of the Kingdom of Bahrain, Legislative Decree No. 48 of 2002, the "Telecommunications Law").

## **Position Paper on Internet and Online Applications**

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# Position Paper on Internet and Online Applications

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## 1 Introduction

Over the past few years, access to the Internet <sup>(1)</sup> has become easily available to a large segment of people across the globe, not only in developed countries but also in emerging markets. This trend has been fuelled by the rise of mobile Internet, facilitated by declining price-points of both smartphones and mobile broadband plans, as well as by the growing availability of robust fixed and mobile access networks and the overall decline of wholesale transit costs.

This combination of factors has paved the way for the explosion of online applications providing services and content to end-customers, which are generally known as over-the-top (“OTT”) services, in that they are accessible through the Internet and transmitted over the networks of the telecommunications operators. OTT applications comprise a variety of applications which enable services over the Internet, such as voice and messaging services, media, content distribution and e-commerce. Furthermore, the exponential increase in Internet traffic and the abundance of OTT applications and players has had a considerable influence on the evolution of the telecommunications industry as a whole.

On the one hand, traditional business models of telecommunications operators has been shaken, particularly in terms of declining revenues as a result of the growing use of Internet-based (“IP”) communication services made possible by OTT applications. As a result, operators have argued that the incentives and their ability to carry out investments to upgrade existing networks aimed at meeting the increasing data demand could be significantly curbed. Moreover, the proliferation of IP-communications networks has resulted in a separation of applications and network layers, with OTT providers delivering their content and applications directly to end-users. Consequently, traditional telecommunications operators have been experiencing a gradual reduction in their commercial grip over end-customers with regards to the provision of traditional communications services and have expressed their anxiety over assuming the role of “dumb pipes”.

On the other hand, end-users have been generally benefiting from the free/low-cost and innovative nature of OTT applications, as well as from their variety and functionality. However, the increased use of the Internet and OTT applications has led to greater exposure to previously less significant vulnerabilities, such as cyber-attacks, malware, circulation of unlawful content, loss/damage of information, leak of personal data, and violations of privacy. While these vulnerabilities may threaten the security of both the Internet and of the underlying infrastructure, addressing them is costly and potential actions need to be assessed from a standpoint that takes into consideration other public interests (including the freedoms of corporations and individuals). In this context, some

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<sup>1</sup> In this position paper the term “Internet” refers to the public IP networks, as opposed to managed IP networks that operate on a ‘better than best effort’ delivery basis (see paragraph 5.1 below).

changes in the overall telecommunications regulatory regime are considered essential as it would strike a balance between consumer welfare and safeguarding effective and sustainable competition in the market.

## 2 Purpose and Legal Basis

The purpose of this position paper is for the Telecommunications Regulatory Authority (the “Authority”) to set out its view in relation to the evolution of the Internet and of online applications, particularly with regards to the relationship between OTT players and telecommunications operators (*rectius*, “Licenced Operators” as defined under the Telecommunications Law of the Kingdom of Bahrain, Legislative Decree No. 48 of 2002, the “Telecommunications Law”) <sup>(2)</sup>, which also affects end-customers and national security, based on Articles 3(b)(1), 3(b)(2) and 3(b)(18) of the Telecommunications Law.

In particular, this position paper aims to provide an overview of:

- market trends in relation to the main types of OTT applications;
- the main policy issues associated with such trends and the potential scope for regulatory intervention, also in relation to the practices adopted in other jurisdictions; and
- the approach that, in this phase, the Authority considers most appropriate.

This paper is without prejudice to the legal position or the rights and duties of the Authority to exercise its powers and prerogatives as envisaged by the Telecommunications Law. Any views expressed are not binding on the Authority, and are without prejudice to the final form and content of any decisions the Authority may take.

This paper is not a substitute for any regulation or law and does not constitute legal advice. It may be reviewed and amended as appropriate in light of further market developments and possible changes in the law, regulations, or practice of the Authority.

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<sup>2</sup> Except where reference is made specifically to a justice entity or public authority which is licensed to operate a Telecommunications Network or to provide Telecommunications Services under the Telecommunications Law in the Kingdom of Bahrain (for which the definition “Licensed Operator(s)” will be used), lower case letters will be used.

### 3 Market Trends and Proposed Classification of OTT Applications

#### 3.1 Market Trends

At a global level, the growth of the Internet has been associated with increased living standards, improved job conditions, and higher GDPs <sup>(3)</sup>. The Internet has nurtured a favourable environment for innovation and development of alternative services, which has enabled new waves of business models and given unparalleled access to an increasingly wider audience to previously unattainable sources. In line with these trends, policy makers around the globe have been placing the roll-out of high-speed next generation broadband infrastructure needed to sustain the momentous growth of Internet traffic at the core of their agendas and objectives for the next few years <sup>(4)</sup>.

With smartphones and mobile devices effectively becoming the epicentre of a growing number of human activities, backed by increasingly available super-fast mobile networks (operators across the globe are expected to invest \$ 1.1 trillion in LTE networks by 2017, with LTE connections expected to reach 2.5 billion in the next five years) <sup>(5)</sup>, the potential growth of Internet-based services covers a wide range of options, including e-commerce/m-commerce, e-health/m-health, and e-education <sup>(6)</sup>.

In Bahrain, mobile broadband subscriptions have driven the overall broadband growth (reaching a penetration rate of 182% at the end of the first quarter of 2015) over the past couple of years, which increased by 6% between the end of 2014 and the first three months of 2015 <sup>(7)</sup> (see Table 1 below).

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<sup>3</sup> Organization for Economic Co-operation and Development, “*Executive Summary of the Roundtable on Financing of the Roll-Out of Broadband Networks*”, 2 December 2014, available at [www.oecd.org/competition/financing-of-roll-out-of-broadband-networks.htm](http://www.oecd.org/competition/financing-of-roll-out-of-broadband-networks.htm); McKinsey Global Institute, “*Impact of Internet and Economic Growth*”, 2011, available at [www.mckinsey.com/insights/high\\_tech\\_telecoms\\_internet/the\\_great\\_transformer](http://www.mckinsey.com/insights/high_tech_telecoms_internet/the_great_transformer).

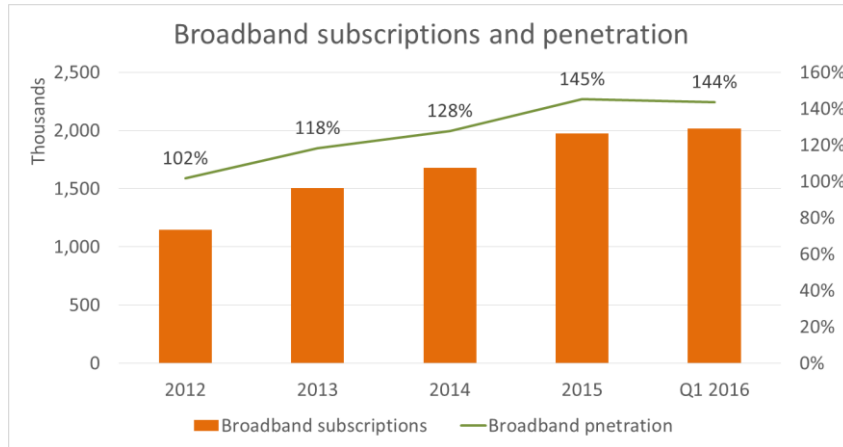
<sup>4</sup> OECD, “*Financing of the Roll-out of Broadband Networks*”, June 2014.

<sup>5</sup> Novo Management Consultants “*Impact of Globalization of Telecom on the Regulatory Activities*”, Telecommunications Regulatory Authority of the Kingdom of Bahrain, April 2015.

<sup>6</sup> The development of particular m-services such as m-commerce and m-health (but also m-based money transfer services) depends greatly on the regulatory obligations that usually constraint the provision of such services, particularly in the financial/health industry.

<sup>7</sup> In terms of number of subscriptions Bahrain had 2.47 million broadband subscriptions at the end of the first quarter of 2015.

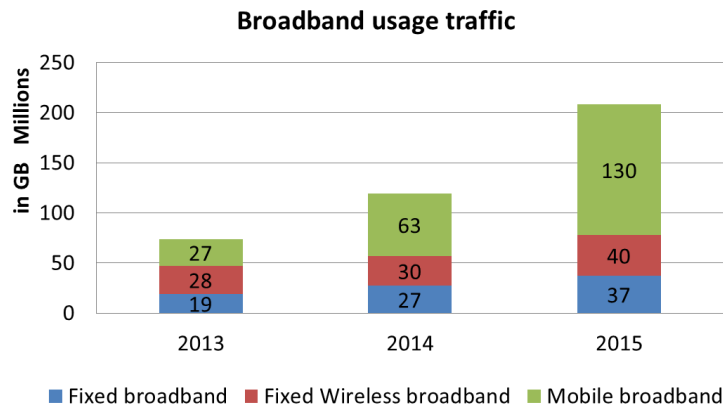
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*Figure 1: Number of broadband subscriptions and penetration*  
 Source: TRA analysis based on data provided by Licensed Operators

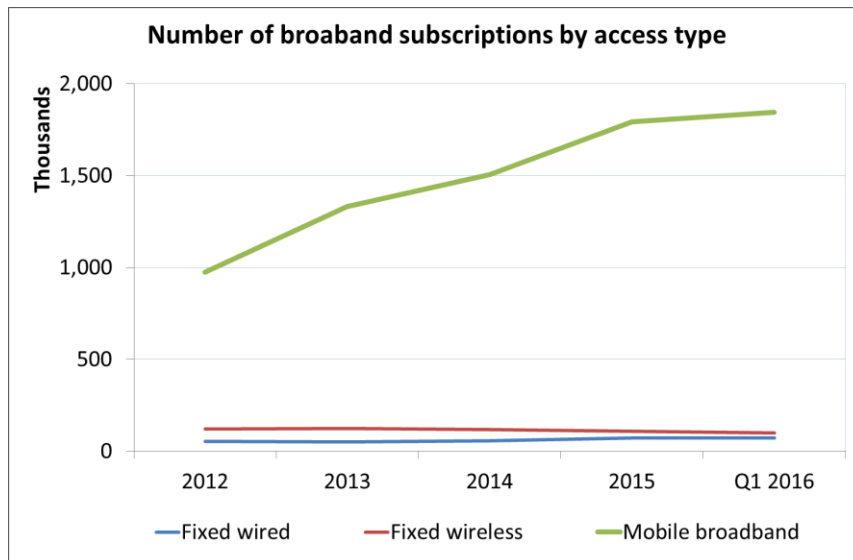
Overall, at the end of the first quarter of 2016, mobile broadband subscriptions represented approximately 91% of the total broadband subscriptions.

Consistently, mobile broadband-generated Internet traffic accounts for an increasing proportion, with quarterly usage increased from GB 27m in 2013 to GB 130m in 2015 (see Figure 2 below).



*Figure 2: Broadband usage traffic*  
 Source: TRA analysis based on data provided by telecommunications operators

On the other hand, fixed broadband lines have been stabled in Bahrain (see Figure 3 below).



*Figure 2: Number of fixed lines in Bahrain by the end of Q1 2015*  
 Source: TRA analysis based on data provided by Licensed Operators

According to estimates, mobile-broadband subscriptions reached 2.3 billion at the end of 2014, with mobile-broadband penetration reaching 32%. In developed countries, it has been estimated that mobile-broadband penetration reached 84%, a level four times higher than in developing countries (21%). In particular, mobile-broadband penetration levels are highest in Europe (64%) and the Americas (59%), followed by the Commonwealth of Independent States (49%), the Arab States (25%), Asia-Pacific (23%) and Africa (19%)<sup>(8)</sup>. Global mobile subscriptions are forecast to rise from 6.7 billion to 8.5 billion by the end of 2019<sup>(9)</sup>.

In spite of these growing trends in the consumption of internet traffic, the telecommunications industry is experiencing globally a negative/stable growth in terms of mobile revenues, ranging from -2–0% in Western Europe, to 0%–2% in Northern America, to 4%–5% in the Middle East and Africa region, and to 3%–4% in the Asia Pacific region<sup>(10)</sup>. Estimated global mobile revenue loss is expected to reach \$ 100 billion by 2016 in the provision of voice services alone, with forecasts indicating that losses will reach EUR 248 billion in 2020 for the regions that are suffering the most (i.e. North America and Western Europe)<sup>(11)</sup>.

The revenue erosion suffered by operators can be partially linked to the fact that markets have reached a near-saturation stage, characterized by generally declining growth patterns. The proliferation of OTT applications offering Internet-based communications

<sup>8</sup> Estimates elaborated by the UN Agency for information and communication technologies, ITU (International Telecommunication Union), [www.itu.int/net/pressoffice/press\\_releases/2014/23.aspx](http://www.itu.int/net/pressoffice/press_releases/2014/23.aspx).

<sup>9</sup> Ovum, "Telecom, Media & Entertainment Outlook 2015", available at [http://info.ovum.com/uploads/files/Ovum\\_Telecoms\\_Media\\_and\\_Entertainment\\_Outlook\\_2015.pdf](http://info.ovum.com/uploads/files/Ovum_Telecoms_Media_and_Entertainment_Outlook_2015.pdf).

<sup>10</sup> Analysis Masons, 2014. The positive trends in the MEA and APAC regions are related to their markets not being as mature as the Western European/North American ones.

<sup>11</sup> Idate Research, "Future of Communication 2020", 2012.



services has also affected operators' ability to generate revenues from voice and text messaging, as end-customers have progressively turned to OTT applications that serve similar purposes as traditional communications services.

Table 4 below provides an overview of the increasing proportion of consumers engaging in Internet-related activities by reference to 2011 and 2014:

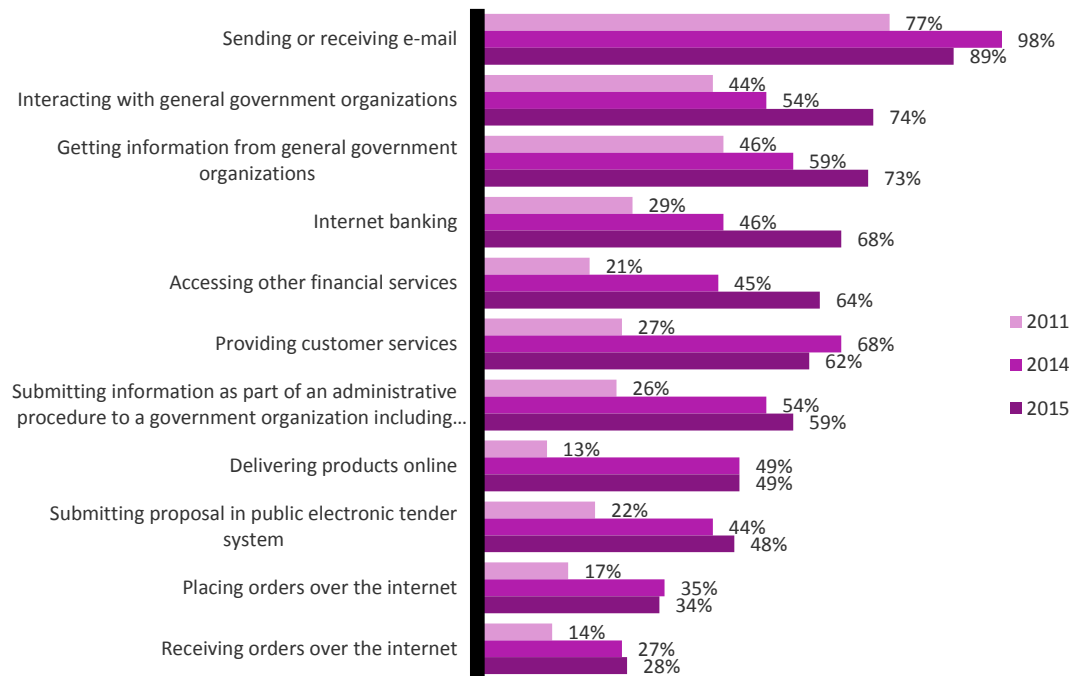


*Figure 4: Internet Applications Usage Trend (Residential)*  
 Source: 2015 Telecommunications Market Survey Report Residential Results, Nielsen

Figure 4 shows that, while social networking remains the preferred Internet activity, VoIP services have become significantly more prominent in 2015 (44%) compared to 2011 (14%).

Also in the business segment Internet-related activities have grown, with sending or receiving email remaining the main online activities among businesses (89% in 2015 and 77% in 2011):

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*Figure 5: Internet Applications Usage Trend (Business)*

Source: 2015 Telecommunications Market Survey Report Business Results, Nielsen

However, this scenario of reduced revenues associated with the growth of OTT applications serving similar as traditional telecommunications services is a very dynamic one, as sources of revenues and value chains are constantly evolving towards new paradigms.

An example of how the relationship between the traditional players is gradually changing can be observed by noting that, while traditional telecommunications operators have typically offered OTT applications to end-users free of charge, OTT players have managed to obtain their revenues from advertisers. This advertising-led paradigm has been fuelled by the increasingly accurate information on end-user preferences that OTT players gather through their applications. However, growing awareness among end-users about the consequences of disclosing personal information and enhanced rules on the exploitation of such information, through data protection laws, has encouraged some OTT players to develop solutions that protect their users from intrusive monitoring, such as 'Do-Not-Track' applications. This, together with saturation of the advertising market, may lead in the future to a renaissance of subscription-based services, which may once again affect the role of telecommunications operators in the industry.

Additionally, by offering their applications free to end-users, OTT players have been sacrificing potential subscription revenues with a view to expanding their presence. Such sacrifice may, however, be short-medium term, as OTT players could recoup the revenues in the future once they will have established their presence on the market.

As a consequence, while the sector is currently experiencing an overall decrease of value as a result of a general loss of revenues <sup>(12)</sup>, in the medium-long term things may evolve differently.

This outcome can also be anticipated as OTT giants such as Google, Facebook, Amazon and Microsoft are furthering their efforts to control an increasing portion of the world's Internet backbone through significant investments. Their initiatives include bringing online new submarine and underground cables that they have funded, entering into long-term agreements to lease dark fiber, and building their own networking infrastructure <sup>(13)</sup>.

Further changes in the investment landscape are likely to result from the role that public authorities and, particularly, governments, play not only in terms of defining the legal and regulatory framework, but also in terms of public funding of improved networks.

While traditionally OTT services were offered by U.S. companies from their headquarters in the United States of America, OTT players have been slowly increasing their regional and local presence for both technical and commercial reasons. This development is likely to increase the ability of governments and regulators to carry-out enforcement actions against OTT providers, which in turn might overcome the jurisdictional issues traditionally associated with the provision of cross-border OTT services and therefore encourage governments and regulators to define more harmonised rules.

In terms of public funding, since access to adequate broadband services is regarded as crucial to foster economic and social development, countries across the world have adopted national broadband strategies and digital agendas to support and expedite the roll-out of broadband. Since the roll-out of fibre to deliver fast broadband is considered commercially viable only in densely populated high-income areas, some form of public financing is often considered to be necessary. In this regard, different approaches have been adopted in different jurisdictions, including direct subsidies (e.g., in EU, US and Chile), indirect subsidies like favourable interest rates or tax breaks (e.g., in Japan), public-private partnerships (e.g., in Mexico), and publicly built networks operating at the wholesale level (e.g., in Australia) <sup>(14)</sup>.

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<sup>12</sup> For example, the telecommunications market was about EUR 263 billion for the United States and the EU5 (including Germany, France, United Kingdom, Italy and Spain) combined is expected to decrease to EUR 248 billion in 2020. The voice revenues, which still form the biggest share of the revenues for telecommunications operators, are expected to drop in the United States EUR from 132 billion in 2012 to 124 billion in 2020, and in EU5 from EUR 100 billion to EUR 89 billion. Idate Research, "Future of Communication 2020", 2012.

<sup>13</sup> See, *ex multis*, B. Darrow, "Microsoft touts new cross-ocean fiber-optic cabling deals as cloud arms race continues", Fortune, 12<sup>th</sup> May 2015; A. Chowdhry, "Google Invests In \$300 Million Underwater Internet Cable System To Japan", Forbes, 12<sup>th</sup> August 2014; D. Fitzgerald and S. Ante, "Tech Firms Push to Control Web's Pipes", The Wall Street Journal, 16<sup>th</sup> December 2013. Facebook and Google are also considering exploring ways to bring connectivity to uncovered areas through satellites: [www.cnn.com/2015/06/09/google-facebook-scrap-satellite-web-plans-report.html](http://www.cnn.com/2015/06/09/google-facebook-scrap-satellite-web-plans-report.html).

<sup>14</sup> Organization for Economic Co-operation and Development, "Executive Summary of the Roundtable on Financing of the Roll-Out of Broadband Networks", see fn. 3 above.

In such a dynamic scenario, OTT applications have disrupted the traditional business of the telecommunications industry by offering Internet-based services that serve similar purposes as traditional telecommunications ones. The following paragraph provides a more detailed overview of how OTT applications interact with telecommunications networks and services based on a proposed classification.

### **3.2 Proposed Classification of OTT Applications**

In general, while all OTT applications are accessible via the Internet, most OTT providers do not operate a network nor do they lease network capacity from a network operator.

As such, OTT players have sometimes been referred to as “free riders”. However, this approach is not entirely accurate, insofar as it suggests that OTT providers benefit from resources for which they do not pay, or that OTT services are per se detrimental to operators’ business. In fact, OTT providers do pay to use commercial Internet transit services to deliver their traffic to end-users <sup>(15)</sup>, and in many cases OTT services do bring added value to the networks and to network operators, since they attract end-customers and generate traffic without disrupting demand for traditional communications services.

OTT applications may be classified according to a variety of criteria. This position paper proposes a classification based on the use that is generally made of a given OTT service, as it emphasizes when OTT applications are more likely to interfere with traditional communications services.

While the proposed classification may be useful in terms of providing guidance as to the use that is typically made of the main OTT services, it is worth noting that it will likely lose relevance in the coming years, as boundaries between Internet applications are blurring <sup>(16)</sup>.

#### **3.2.1 OTT Communications (Messaging and Voice Services)**

The main purpose of OTT communications applications is to enable communications over the public Internet service, such as voice (“VoIP”) and messaging, which, in contrast to traditional communications services relying on managed and dedicated transmission networks, use contended transmission network (i.e. Internet access) and the public Internet as the transport medium.

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<sup>15</sup> J. Scott Marcus, “*The economic impact of Internet traffic growth on network operators*”, WIK-Consult GmbH, 24th October 2014.

<sup>16</sup> Facebook, for example, traditionally classified as an OTT ecosystem, promotes the circulation of a significant amount of content, including music and videos. Also, Facebook Messenger provides instant messaging services through Facebook Messenger, as well as through WhatsApp (though indirectly). Modern apps designed for the workplace such as Slack even aim to abolish traditional email and combine messaging with complex online team collaboration.

As previously mentioned, these OTT applications are capable of affecting the traditional business model of telecommunications operators significantly, in that the former provide services that serve similar purposes as those provided by the latter.

VoIP and video-based Internet OTT communications include globally popular applications such as Skype, Viber, Google Plus, and FaceTime. The growth of OTT communications has been encouraged, *inter alia*, by the flat rate data plans that telecommunications operators started offering, by the increased availability of Wi-Fi access to broadband networks, and by improved technologies. The high penetration of smartphones, due to increasingly affordable prices, has sustained the growth of OTT communications in the mobile environment.

IP-messaging (provided by applications such as WhatsApp, Facebook Messenger, Telegram), on the other hand, has experienced an even more significant growth mainly because of the low bandwidth they generally require, but also thanks to the appealing features (text, audio, graphics) that are available to the public at a very low cost to the end-user (*i.e.*, the price of Internet connectivity). Although this expansion will eventually slow down, IP-messaging is expected to gradually replace traditional SMS.

In any event, boundaries between types of communications are increasingly blurring, as communications providers are moving towards aggregating various types of communications (while prioritizing the visual ones) and services. For example, Google Hangout integrates advanced forms of visual communications with traditional Internet-based voice traffic. Indeed, Google Hangout allows end-users to talk while seeing the other members of the conversation, just like Skype or FaceTime. Google Hangout and Skype also feature an instant messaging service that overlaps with voice/video communications. Google Hangout, in addition, enables end-users to virtually draw over their own image as reproduced by the webcam, so as to create peculiar visual effects that are seen by the other members of the conversation, such as adding a crown or mask. WhatsApp, on the other hand, is gradually introducing forms of visual and video communications into instant messaging, as it now allows end-users to include pictures/videos in their messages, as well as voice messages.

While OTT communications applications adopt a variety of business models<sup>(17)</sup>, at the present time end-users often do not incur any extra cost for the use of OTT communications applications other than the cost of the access to the Internet. As mentioned in paragraph 3.1 above, though, this scenario is expected to change significantly in the future as both sources of revenues and value chains evolve towards new paradigms.

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<sup>17</sup> At the moment, these business models typically include: (i) free services (Skype-to-Skype or Viber-to-Viber); (ii) bundled services (Apple's FaceTime, Android's Google Hang Out); (iii) "freemium", including basic features for free and advanced features that are charged for (group conferencing on Skype); and (iv) paid for (Skype-out). Such variety suggests that the income model traditionally adopted by operators, based on subscriptions and metered services, might be soon become outdated. See Detecon Consulting, "Policy and Regulatory Framework for Governing Internet Applications", March 2014.

### 3.2.2 OTT Ecosystems

This segment comprises mainly of non-real time applications associated with social networks, e-commerce, and cloud services, such as for example Amazon, Google, Microsoft, Apple, Facebook, Instagram, Twitter, and LinkedIn.

The players in this segment often move from a core service (e.g., advertising for Google, social networking for Facebook, e-commerce for Amazon, software for Microsoft, devices for Apple, etc.) and gradually expand their presence along the whole value chain. Their offer includes a wide range of strategic services (usually provided for free) that supplement and reinforce the core service (the profitable one), thereby locking-in end-users and provoking a self-sustaining network effect.

The development of OTT ecosystems has had a significant impact on the data traffic generated by the relevant websites. They either carry videos to enrich the user experience, or involve graphic data, or both, which results in a substantial increase in bandwidth hungry data traffic. Moreover, these websites capture the greater share of all the Internet traffic and links.

In general, the growth of these OTT players is linked to the increasing number of end-users using the Internet (which now exceeds a third of the world population) <sup>(18)</sup>.

### 3.2.3 OTT Content

These OTT applications include applications that offer media/audio content being streamed/downloaded online and represent a significant share of the overall Internet traffic. YouTube, Netflix, and Spotify notably belong to this category.

These applications have experienced an incredible expansion over the past few years, due to a number of factors: (i) the increased availability of high speed broadband has made the heavy traffic associated with content streaming/downloading sustainable; (ii) content providers have developed viable business models, based on both advertising for user-generated/basic content, and subscriptions for premium content; and (iii) from the consumers' perspective, these services successfully address the growing preference for "on demand experience" as opposed to the traditional "push experience" of typical broadcasting <sup>(19)</sup>.

OTT content applications are not only relevant to the deep changes experienced by the telecommunications industry. Indeed, some OTT content, such as Netflix, has also been pioneering new revenue-generating business models that may affect the subscription-

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<sup>18</sup> According to ITU (the United Nations specialized agency for information and communication technologies), by end 2014, the number of Internet users globally has reached almost 3 billion. Two-thirds of the world's Internet users are from the developing world. This corresponds to an Internet-user penetration of 40 per cent globally, 78 per cent in developed countries and 32 per cent in developing countries ([www.itu.int/net/pressoffice/press\\_releases/2014/23.aspx](http://www.itu.int/net/pressoffice/press_releases/2014/23.aspx)).

<sup>19</sup> OTT media should not be confused with IP-TV, which is Internet-based television where content are distributed over the Internet but where access to online content is managed.

based pay TV models of traditional players currently central to the content distribution segment <sup>(20)</sup>. Should these innovative business models gain popularity, new opportunities for telecommunications operators to generate revenues may emerge, for example through the provision of business-to-business wholesale content delivery network services to content providers.

## **4 Implications of Current Market Trends for the Stakeholders and Underlying Policy Issues**

Market trends as outlined in paragraph 3 above have significantly affected all the stakeholders involved, including in particular: (i) telecommunications operators; (ii) OTT players; and (iii) end-users. Market developments have had also some important repercussions in terms of national security. Although tackling national security issues does not fall within the competences of the Authority, this paper refers to a few of them for the sake of completeness.

### **4.1 Implications for Telecommunications Operators**

As current market trends emphasize that high-speed networks are essential for the development of the Internet and online applications, the role played by networks operators is also bound to be essential in the future.

However, with OTT communications that serve similar purposes as traditional telecommunications services and with the demand for robust networks and data traffic increasing rapidly as the use of OTT ecosystems and OTT content increases, the role of telecommunications operators has gradually altered. In the coming years, this role can be expected to be less strongly related to the provision of telecommunications services and more and more related to the operators' ability to invest in improved infrastructures capable of sustaining the growing demand for data traffic associated particularly with OTT content

In fact, among the most relevant effects of the proliferation of OTT communications is the gradual separation of applications and network layers, with OTT providers delivering their content and applications directly to end-users. Consequently, telecommunications operators have progressively lost their commercial grip over one of their most valuable assets, *i.e.*, their customer base. In many operators' view, this is resulting in a gradual

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<sup>20</sup> Netflix, the world's most widely used provider of Internet-delivered video on-demand, both for free (VoD) and on a subscription basis (SVoD), represents an interesting example. It started with a DVD rental-by-mail business in the late 90s, which allowed the creation of a huge customer base across the United States. Subsequently, Netflix carried over its existing large customer base and became the first successful provider of online video streaming services. As competition in this segment increases, Netflix is defending its role through international expansion and business differentiation, also thorough successful partnerships with telecommunications operators across the globe.

shift in their role, increasingly assuming the role of mere “dumb pipes”<sup>(21)</sup>. This trend has been exacerbated by the gradual shifting of customers’ purchasing decisions up along the value chain, such choices being based more on handsets, operating systems and functionalities rather than on the underlying network operator.

In an attempt to encourage end-customers to prefer traditional communication services to Internet-based ones, telecommunications operators have introduced flat rates, which however have contributed to lowering the value of voice and messaging, already commoditized by the great availability of voice and messaging services offered by OTT communications. The fact that traditional communication services, which are usually perceived as more reliable<sup>(22)</sup>, do not offer enhanced communications experiences the way OTT communications do, has further reduced the value of traditional voice and messaging. In addition, service bundles (from double to quadruple play), on which telecommunications operators have relied heavily to foster user appeal and reduce churn, have also led to a further devaluation of standard voice and messaging services.

The ever-increasing load on networks stemming from growing data traffic (particularly in relation to OTT content, but also to video communications), which has been adding value to telecommunications networks, has also placed a burden on operators to carry out near-continuous network upgrades so that end-users’ demands are met. On the other hand, however, declining revenues resulting from market saturation and the proliferation of OTT communications applications are threatening the returns on existing investments, hence putting in question traditional business plans and reducing the available resources (and incentives) for future investments. In this regard, it could be noted that telecommunications operators failed to fully anticipate current trends, which sees value shifting from voice to data services, so as to timely adjust their business models aimed at making data services more profitable.

In order to protect their revenues, operators could in principle adopt one of two approaches: (a) prevent or hinder access, particularly to OTT communications (as these OTT services are most likely to erode their revenues); or (b) attempt to adjust their business models to the evolving market conditions, by for example rebalancing their pricing structures and by generating new data-based revenues as revenues from voice services decline<sup>(23)</sup>. As further discussed in section 5.2 below, the market has developed consistently in line with these two options.

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<sup>21</sup> The “dumb pipes” expression has been widely used to refer to the scenario where telecommunications operators are seen as little more than a utility service. See, for example, [www.economistinsights.com/sites/default/files/EIU\\_Fighting%20smart\\_Final\\_WEB.pdf](http://www.economistinsights.com/sites/default/files/EIU_Fighting%20smart_Final_WEB.pdf).

<sup>22</sup> See section 5.1 below as regards the “quality of service”.

<sup>23</sup> Other potential options for telecommunications operators include: (i) partnering-up with specific OTT players to develop mutually beneficial relationships, based on agreements or joint ventures; (ii) competing with OTT players by developing their own OTT applications; or (iii) focusing on providing transit services to OTT players running on their network in order to fully exploit the centrality of their infrastructures for the entire ecosystem.



The ability of telecommunications operators to actually implement either of these approaches is however subject to the prevailing legal and regulatory regime, which could give scope for regulatory intervention.

## 4.2 Implications for OTT Players

OTT players have grown spectacularly, mainly through offering free-of-charge services to end-users <sup>(24)</sup>, with their focus being on establishing presence rather than on monetization – at least in the short term <sup>(25)</sup>. OTT players have been able to expand their reach quickly also because they can benefit from economies of scale, since their services address a global market where a significant share of potential users are still unconnected <sup>(26)</sup>.

OTT ecosystems gain their profits from their core business, while offering other ancillary ones (often including OTT applications) free-of-charge. For example, Google and Facebook obtain profits from online advertising, Apple and Microsoft from the sale of their devices. OTT content, on the other hand, subsidize free services through “freemium” or “paid-for” services <sup>(27)</sup>.

As a result, the business of OTT players has generally been highly profitable, whereas the overall value of the communication services market has decreased, due also to the commoditization of voice/messaging services determined by the proliferation of OTT communications and of flat rate tariff models.

On the other hand, OTT providers do face challenges themselves particularly in relation to: (i) slow-paced innovation; and (ii) potential regulatory constraints.

### 4.2.1 Slow Paced Innovation

OTT players expect (and in most instances rely on) high quality Internet to deliver their services. As such they are vulnerable to the slow pace that telecommunications companies have sometimes adopted in terms of rollout of fast broadband networks and upgrade to the network infrastructure. However, the revenue erosion which operators are suffering from, discussed in section 4.1 above, negatively affects OTT players as well. Indeed, should the network fail to sustain increased and heavier traffic loads, OTT providers would not be able to meet end-users’ demands. Also, reduced network quality would enable telecommunications operators to potentially rely on traffic management in

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<sup>24</sup> It should be noted however that customers are still charged for such services through the payment of the Internet access rental.

<sup>25</sup> Detecon, “*Policy and Regulatory Framework for Governing Internet Applications*”, 2014.

<sup>26</sup> Novo Management Consultants “*Impact of Globalization of Telecom on the Regulatory Activities*”, Telecommunications Regulatory Authority of the Kingdom of Bahrain, April 2015.

<sup>27</sup> See footnote 3 above.

an arbitrary and unjustified manner, at odds with even a broad interpretation of the net neutrality principle (see below, section 5.2).

#### **4.2.2 Potential Regulatory Constraints**

OTT applications have managed to make significant inroads into the Internet and communications environment partially due to the lack of any regulatory constraints, which is juxtaposed to the position in which telecommunications operators find themselves in.

While this state of affairs has encouraged innovation by OTT providers, this regulatory imbalance has been acknowledged by regulators and policy-makers and the question is being mooted as to whether a different regulatory balance between telecommunications operators and OTT players should be retained.

#### **4.3 Implications for End-Customers**

It is abundantly clear that, at least in the short term, end-users have benefited immensely from the new ecosystem. As Internet penetration levels increase, consumers continue to enjoy an ever widening choice of easily accessible and innovative services and content, mostly available free-of-charge at consumption. However, the declining revenues that are threatening telecommunications operators' business might negatively affect end-users too in the future, as in the long term they might not be able to benefit from improved infrastructures.

OTT applications have inevitably evolved so as to accommodate customers' preferences and experiences, by offering increasingly greater customized services and on-demand content that anticipate end-user preferences. Some OTT content (e.g. YouTube, Netflix, Spotify and Apple Music) allow end-users to enjoy audio/visual content when and where they please. Applications such as YouTube, Spotify and Apple Music, by monitoring end-users' online behaviour, record their preferences and suggest content accordingly.

OTT ecosystems, such as Google and Facebook, rely on users' online behaviour to extract data about their interests and needs. Based on this data, advertising can be targeted in an increasingly accurate manner, by reference to single users, rather than to generic categories of consumers <sup>(28)</sup>.

Furthermore, individuals are no longer mere consumers in the online environment, as their role as suppliers of both content and services has become increasingly important. For example, platforms like YouTube and Vimeo are fueled by user generated content and applications like AirBnB exist purely thanks to the willingness of individuals to take

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<sup>28</sup> This has notably made the advertising space available within OTT ecosystems particularly valuable to online advertisers and hence profitable for OTT ecosystems. This effect is further enhanced by the circumstance that on many occasions OTT ecosystems and applications are interwoven (for example, Messenger is an application available within Facebook ecosystem; Google Hangout is provided within Google ecosystem).

part into the so-called “sharing economy”. Platforms like eBay and Amazon allow people to both buy and sell goods and services, creating so-called ‘prosumers’, who can behave in innovative ways that defy traditional notions of producers as exploitative and consumers as passive actors. Finally, it is obvious that social networks rely entirely on the concept of users actively contributing to content sharing and circulating for the benefit of other users.

While in this scenario end-users preferences and interests are prioritized to the maximum extent; it also implies a few threats, including in particular denial of service and other malicious attacks and loss of privacy.

#### **4.4 Implications in Terms of National Security**

The main consequences for national security associated with the increasing data traffic are mainly related to: (i) the security of the telecommunications infrastructure; (ii) the potential harm associated with the circulation of unlawful content and/or applications with wrongful intent towards individuals, corporations or the government; and (iii) law enforcement relations with service providers.

##### **4.4.1 Infrastructure Security**

The increased data traffic associated with growing Internet usage has resulted in a surge of malicious traffic, threatening the security of both the telecommunications infrastructure and the online environment.

Enhancing the security of the network as well as the online environment against malicious attacks implies identifying and tackling the vulnerabilities to physical or cyber-attacks, and developing systems to identify and prevent attacks, as well as capabilities to restore essential functionalities following any attack. This requires cost and effort that would be typically borne jointly by public institutions, operators and end-users, who are also called to contribute to the security of the network (for example, by ensuring that their software is up-to-date and by adopting other general precautions).

In Bahrain, the initiative has been taken through Law No. 60 of 2014 on the Information Technology Crimes, establishing penalties ranging from a fine to imprisonment for conducts against infrastructure security, including hacking into IT systems with no permission, tampering with or damaging data, and circulating content of a sexual nature.

##### **4.4.2 Circulation of Unlawful/Harmful Content**

The data traffic flowing on operators’ networks is huge and may contain all sorts of information, including illegal content and applications with harmful intent towards individuals, corporations or the government. With user generated content having become a dominant internet paradigm since 2005, these risks have become even more significant. In theory, the circulation of this content could be limited through content regulation/censorship, with the view to, for example, protecting minors, social values, human rights, preventing violence or stopping illegal activities.

Content regulation is however not a straight forward solution. From the outset, it requires an effective monitoring of the data traffic, which is onerous and complex, particularly due to the vast amount of information that needs to be processed. Content regulation, in any event, has to be reconciled with prevailing social values, policy priorities and political objectives, as it might be perceived as an interference with individual freedoms and privacy <sup>(29)</sup>.

In Bahrain, Article 19 of the Legislative Decree No. 28 of 2002 with respect to Electronic Transactions encourages network intermediaries (which include some OTT providers) to remove third party information to which they provide access from any information system within their control, if the making, publication, dissemination or distribution of such information gives rise to civil or criminal liability. This provision, while not establishing any general monitoring obligations, encourages OTT providers to take action once they are put on notice of any illegal content.

#### **4.4.3 Law Enforcement Relations**

The difficulties associated with extracting meaningful information from the Internet affects also the legally authorised surveillance of an individual's use of telecommunications for the purpose of intelligence or evidence known as "lawful intercept". Lawful intercept in relation to subject, timing, location and modalities of a communication is accepted as a necessary tool for investigating and prosecuting crimes and most jurisdictions impose an obligation on telecommunications operators to grant law enforcement entities access to their infrastructures for these purposes. The conditions under which lawful intercept is permitted does however vary from country to country.

In Bahrain, Article 78 of the Telecommunications Law and Resolution No. 8 of 2009 establishes an obligation on Licensed Operators to allow security organs to have access to their networks for national security purposes.

Legal systems have evolved over time so as to apply lawful interception on Internet-based communications. However, it is currently more difficult to intercept Internet-based voice traffic as calls appear to have originated from virtual numbers from foreign countries. As regards messaging, difficulties are associated with the encryption keys relied on by OTT players, which, while serving a key security purpose by protecting systems, infrastructures and end-users, inevitably make it more difficult for law enforcement agencies to perform their tasks.

In this regard, cooperation at the Gulf Cooperation Council level as well as with other regional partners will help Bahrain identify and implement appropriate solutions, with a view to ensuring regulatory certainty and consistency at a regional level, for the benefit of all stakeholders involved.

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<sup>29</sup> Detecon Consulting, "Policy and Regulatory Framework for Governing Internet Applications", March 2014.

## 5 Scope for Regulatory Intervention

Among the policy issues underlying the growth of the Internet and online applications, as outlined in the previous paragraph, the Authority, taking into consideration the scope of its own competences and powers, regards it as a priority to preserve the ability and incentives of telecommunications operators to invest in upgraded networks in the long-term.

In principle, the areas for potential regulatory intervention to be considered with a view to pursuing this goal refer to: (i) creating a level playing field through regulatory instruments; and (ii) defining net neutrality.

### 5.1 Creating a Level Playing Field through Regulatory Instruments

While telecommunications operators are subject to a number of regulatory obligations and requirements that significantly influence their business, the Internet and OTT applications are generally regulated in a far less detailed and prescriptive manner. This has been the case mainly because, on the one hand, regulators and legislators have refrained from intervening, with the view to encouraging innovation and, on the other hand, the cross-border nature of many OTT services has raised the jurisdictional issues mentioned in section 3.1 above. Arguably, the Internet and online applications have grown at such a fast pace precisely thanks to the lack of regulatory constraints.

However, in theory, a different regulatory treatment might result in higher regulatory costs for the regulated service and distort its ability to compete with an unregulated service of the same functionality<sup>(30)</sup>. Licensed Operators and telecommunications operators in other countries, as already noted, have perceived this as a regulatory imbalance and have been complaining about it. Their anxiety has been expressed particularly in relation to OTT communications, considering that the latter largely serve similar purposes as traditional telecommunications services<sup>(31)</sup>. The perception could be further exacerbated by the fact that telecommunications operators, thanks to extensive roll-out of LTE networks, are also increasingly offering IP-based telephony services (such as so-called “Voice on LTE”, or “VoLTE”), but which are subject to the same regulatory treatment applied to traditional telephony services, as opposed to OTT

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<sup>30</sup> BEREC Report on OTT services, January 2016, Report on OTT services, January 2016, BoR (16) 35, 4.4., p. 22.

<sup>31</sup> See, for example, [www.publicpolicy.telefonica.com/blogs/blog/2014/06/13/level-playing-field-between-telco-operators-otts/](http://www.publicpolicy.telefonica.com/blogs/blog/2014/06/13/level-playing-field-between-telco-operators-otts/) for an argument against regulation of OTT communications.

In this scenario, in the public consultation launched by the European Commission on 11<sup>th</sup> September 2015 as a first step in the review of the EU regulatory framework for electronic communications, feedback from stakeholders is sought as to whether, among other things, OTT communications are “*functionally substitutable*” to existing electronic communication services (ECS). It asks whether both new and existing services should fall under a common definition of ECS. See <https://ec.europa.eu/digital-agenda/en/news/public-consultation-evaluation-and-review-regulatory-framework-electronic-communications>.

communications such as Skype that may offer calls to public telephone numbers in an equivalent manner <sup>(32)</sup>.

In general, the areas of regulation featuring regulatory dissimilarities can be identified as follows: (i) licensing; (ii) interconnection; (iii) provision of lawful intercept; (iv) access to emergency services; (v) quality of service; and (vi) net neutrality.

Net neutrality will be discussed separately in the next section.

### 5.1.1 Licensing

In general, while telecommunications operators need to obtain a license or authorization in order to be able to provide their services, such a requirement does not apply to service providers offering OTT communication services. The conclusive argument on whether or not a license should be obtained by OTT communications lies in the definition of the services that telecommunications operators, on the one hand, and OTT communications, on the other hand, respectively provide. Considering that these services serve similar purposes, the demarcation line is not always straight forward. Indeed, different outcomes can be reached depending on whether an approach based on the technology used or the purpose served is adopted.

The European Union (“EU”), for example, has encouraged a regime based on the technology used that is applicable to electronic communications networks, i.e. transmission systems which permit the conveyance of signals by wire, by radio, by optical or by other electromagnetic means, including satellite networks, fixed and mobile terrestrial networks, electricity cable systems, networks used for radio and television broadcasting and cable television networks, irrespective of the type of information conveyed.

In such a regime, OTT communications are generally not considered as “electronic communication services” (“ECS”) because they require users to already have an underlying conveyance system. While the provision of ECS is generally authorised without further approval, some Member States impose a notification obligation, aimed at allowing national regulators to assess whether the referred services are regulated ones.

In France, the telecommunications regulator *Autorité de régulation des communications électroniques et des postes* (“ARCEP”), has requested Skype to declare itself as an “electronic communications operator” (pursuant to the taxonomy applied within the EU) and to comply with the obligations set forth in the French Postal and Electronic Communications Code, particularly as regards the routing of emergency calls,

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<sup>32</sup> The so called “IP-telephony” solutions aim at providing exactly the same services as a public switch telephone network (PSTN) or internal business telephone network, using Internet technologies instead of traditional analogue ones. While this transition still often requires the use of a PSTN line, for example to allow calls on non IP-based numbers, when the communication occurs between two IP-enabled devices through these networks, traditional networks can be bypassed altogether. The Internet-based services provided by OTT communications typically fall within this category.

implementing the means required to perform legally ordered interceptions, ensuring portability, and funding the universal service obligation.

ARCEP reached the above conclusions having considered that, while *“not all of the solutions that Skype provides are electronic communications services, this does seem to be the case for the service that allows internet users located in France to call fixed and mobile numbers in France and around the world, using their computer or smartphone”*. After conceding that, being headquartered in Luxembourg, Skype *“is not required to obtain administrative approval to become an electronic communications operator in France”* to provide those services, ARCEP nonetheless maintained that the fact of providing a “telephone service” to the public implies compliance with specific obligations and clarified that a failure to comply with these obligations constitutes a criminal offence. Skype has however thus far failed to declare itself as an electronic communications operator, as a result of which ARCEP has informed the Paris public prosecutor of the above facts <sup>(33)</sup>.

In Germany the same regulatory framework applies to both VoIP and traditional voice services, as regards in particular the provision of free emergency calls, the availability of telecom surveillance, and the retention of traffic data <sup>(34)</sup>. However, according to Board of European Regulators for Electronic Communications (BEREC) findings, nearly all EU regulators would not consider as ECS those OTT services with no possibility to make outgoing calls to public telephone numbers or other voice services <sup>(35)</sup>.

In the United States, broadband providers were initially regulated as ‘information services’ under Title I of the Communications Act of 1934, hence they could not be regulated as common carriers under Title II. As such, Broadband Internet Access Services (“BIAS”) were not explicitly subject to any regulatory obligation which could specifically prohibit blocking, throttling or paid prioritization or any other practices that could jeopardize the openness and freedom of the Internet. After two unsuccessful attempts to address these issues, in February 2015, the Federal Communications Commission (“FCC”) voted to reclassify BIAS as telecommunications services, subject to the “common carrier” regulation under the Title II of the Communications Act of 1934 and Section 706 of the Telecommunications act of 1996.

As a result of these Open Internet Rules, which came into effect in June 2015 (although still subject to legal challenges), BIAS are now subject to many of the obligations used to regulate traditional telephone companies. The FCC has however decided to “forbear” from applying many of these rules, thereby adopting a “light touch” regulatory approach

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<sup>33</sup> See [www.arcep.fr/index.php?id=8571&L=1&tx\\_gsactualite\\_pi1%5Buid%5D=1593&cHash=776a7927e2d50b767cdd1ca984967194](http://www.arcep.fr/index.php?id=8571&L=1&tx_gsactualite_pi1%5Buid%5D=1593&cHash=776a7927e2d50b767cdd1ca984967194).

<sup>34</sup> See [www.bundesnetzagentur.de/cln\\_1411/EN/Areas/Telecommunications/Companies/Companies-node.html](http://www.bundesnetzagentur.de/cln_1411/EN/Areas/Telecommunications/Companies/Companies-node.html).

<sup>35</sup> BEREC Report on OTT services, January 2016, Report on OTT services, January 2016, BoR (16) 35, 4.2.1., p. 20.

towards BIAS <sup>(36)</sup> with a view to encouraging the further development of Internet applications.

In the United Arab Emirates, OTT players are only allowed to provide their services if they work together with licensed telecommunications operators <sup>(37)</sup>, whilst in Saudi Arabia they are blocked due to lawful intercept issues.

In Bahrain, Article 24 of the Telecommunications Law prohibits the operation of a telecommunications network, the use of a telecommunications frequency, or the provision of telecommunications services except under a license. Moreover, Licenced Operators willing to provide enhanced or value added telecommunications data and/or services need to obtain a specific license for this purpose under Article 39 (b)(10) of the Telecommunications Law.

In light of such provisions, the Authority has addressed VoIP services specifically in its Position Paper on Regulation of Voice over Internet Protocol (“VoIP” Services), issued on 30th May 2007 (and as amended on the 14th June 2007). In this paper the Authority, after clarifying that licensing and consumer protection policies should apply to VoIP services in a non-discriminatory manner (hence promoting a technologically neutral approach), further maintained that VoIP services that qualify as Internet applications will be regulated as Internet services; to the contrary, VoIP services that constitute a technological development of existing telecommunications services are to be considered as traditional voice services, and are therefore subject to the applicable regulation (including the licence obligation).

The Authority also concluded that it would not consider telecommunications service providers as subject to its jurisdiction only because their services could be accessed by residents of the Kingdom of Bahrain by utilising the Internet (par. 4.4). However the Authority would consider that the laws and regulation of the Kingdom of Bahrain apply to the service providers “*who effectively, deliberately and purposefully direct their activities to the residents of the Kingdom of Bahrain*” (par. 4.4), irrespective of the place of their establishment. The Authority still takes the same view on this specific aspect with reference to VoIP services running over the public Internet and is willing to extend it to OTT communications in general.

### 5.1.2 Interconnection

For both fixed and mobile telecommunications operators, interconnection is required to terminate calls on each other network. To this end, operators enter into commercial interconnection arrangements. Operators with market power are typically required to grant access to their network under fair, reasonable and non-discriminatory terms, with

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<sup>36</sup> See 47 U.S.C. para 160(a).

<sup>37</sup> See

[www.tra.gov.ae/news/the-general-authority-for-regulating-the-telecommunica-tions-sector-issues-voip-clarification-statement](http://www.tra.gov.ae/news/the-general-authority-for-regulating-the-telecommunica-tions-sector-issues-voip-clarification-statement).



tariffs based on forward-looking incremental costs (see Article 57 of the Telecommunications Laws regards Bahrain).

Generally speaking, there are no interconnection requirements for OTT services. Similarly, the concept of mandatory access to the content or services of OTT providers holding market power is still largely unexplored <sup>(38)</sup>.

### **5.1.3 Provision of Lawful Intercept**

While telecommunications operators are obliged to provide “lawful intercept”, as already pointed out, OTT communications do not normally incur this obligation.

Lawful intercept of Internet-based communications is challenging, due to the fact that government agencies do not have access to the encryption keys relied on by OTT players. An obligation to share these keys with government agencies seems difficult to implement as OTT providers are not required to establish a physical presence in every jurisdiction where their services are made available.

In theory, government institutions could demand unilaterally OTT players to cooperate with security agencies to allow lawful intercept as a requirement for not being blocked in a given country. However, a Government would have to balance this approach against the risk of depriving its citizens of innovative services, business opportunities and access to content and information, which could in turn lead to reputational harm. Moreover, this remedy might prove ineffective as OTT players could easily come up with new encryption keys, thereby forcing government institutions to constantly pursue them.

### **5.1.4 Access to Emergency Services**

While traditional phone services are usually associated with a particular phone number and a fixed address, VoIP services are available to end-users from virtually anywhere in the presence of an Internet connection. As a consequence, the location of the caller cannot automatically be determined and it may be challenging to identify the closest emergency service.

With a view to progressively eliminating the differences between traditional phone services and VoIP ones in this respect, action has been taken by regulators to ensure that emergency calls get through to appropriate public safety authorities.

In the United States, interconnected VoIP (i.e., VoIP fully interconnected with the PSTN), are mandated to provide 911 service without special request and may not allow their customers to “opt-out” of 911 service <sup>(39)</sup>.

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<sup>38</sup> Recently the European Commission obtained from Google some measures aimed at ensuring a non-discriminatory access to its web search results pages by advertisers of competing products, as a result of an investigation into Google alleged anti-competitive conducts on the online search market.

<sup>39</sup> See <https://transition.fcc.gov/pshs/services/911-services/voip/challenges.html>; and <https://transition.fcc.gov/cgb/consumerfacts/voip911.pdf>.

In the UK, VoIP services that: (i) allow users to make calls to traditional fixed or mobile phones but not to receive calls; and (ii) allow users to make calls to and receive calls from traditional fixed or mobile phones, must provide 999 / 112 access at no charge. VoIP providers are also urged to inform domestic and small business customers about the emergency services that they offer and any limitations, pursuant to an industry Code of Practice <sup>(40)</sup>.

#### 5.1.5 Quality of Service (“QoS”)

QoS of telecommunications services comprises requirements on different aspects of the connection, including response time, loss, echo, loudness levels, and crosstalk. In general, telecommunications operators usually undertake to ensure a certain QoS as part of their universal service obligation. QoS may also relate to the ability to prioritize applications, users, or data flow, which implies also the ability to ensure a specific level of performance to a specific data flow.

QoS cannot be ensured to end-users to the same extent in the Internet environment as in relation to the traditional telecommunications services, considering that transmission of data traffic over unmanaged IP networks (or a portion thereof) works in a different way. Indeed, QoS in an unmanaged IP network is less transparent than in traditional circuit networks/managed IP networks. Unmanaged IP networks are not designed so as to carry every IP packet that every user may attempt to send or receive at any given time; rather, they are designed so that excess packets must wait until capacity is available <sup>(41)</sup>. As a consequence, as far as Internet-based traffic is concerned, end-users have generally accepted the “best effort” principle, whereby no guarantees are given as to the actual delivery of the data or the level of priority applied. Under this principle, the bit rate and delivery time vary depending on the current traffic load for all end-users.

Small delays and the “best effort” principle are perfectly acceptable for certain applications such as e-mail or file sharing. However, some Internet-based services (such as IP-TV, VoIP, streaming content in general) are increasingly sensitive to insufficient capacity and require a higher standard than the “best effort” principle to ensure the appropriate customer experience. For this reason, such Internet-based services have traditionally been delivered through managed IP-networks where IP traffic can be controlled and prioritized rather than through the open Internet generally available to the public.

Control of IP traffic is usually done by controlling several criteria associated with the flow of data, namely (i) the average bandwidth; (ii) the average peak bandwidth; and (iii) the instantaneous maximum rate. When packets of data reach the point of ingress of a

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<sup>40</sup> OFCOM, “*Regulation of VoIP Services: Access to Emergency Services*”, 5<sup>th</sup> December 2007, available at <http://stakeholders.ofcom.org.uk/consultations/voip/statement/>.

<sup>41</sup> Directorate General for Internal Policies of the European Parliament “*Network Neutrality Revisited: Challenges and Responses in the EU and in the US*”, 2014, p. 24.

managed IP-network, they are typically classified, then handled according to these criteria and then marked for forwarding in a given forwarding class, which is queued in the network. The packets in the queue are then “de-queued” with the view to reducing the packet loss and delay associated with the different service flows. The reason why traffic prioritization ensures an appropriate customer experience is that the prioritization forwarding scheme just outlined takes place independently of the load on the network. As a result, the service delivery is always guaranteed according to a given standard.

Although in the absence of congestion similar performances will also be seen in the “best effort” service class (because in this case the queues in other forwarding classes are emptied as fast as they are filled), with no packet loss experienced by customers, this outcome is strictly related to the traffic load conditions at a given time. As traffic increases, services in the “best effort service class will be subject to packet loss, while managed services will still perform in a consistent manner.

Broadly speaking, currently two categories of managed services exist:

1. those created by an operator for servicing an established need on the part of the end-customer (consumer, enterprise or public entity), including IPTV, voice services and VPNs; and
2. those requested directly by customers with an enhanced QoS need for a specific service, such as VoIP, real time streaming, and online gaming.

Category 2 is an emerging category of services that is becoming increasingly important as end-customers expect a wider range of services (including, for example, video streaming, instant communication and online gaming) to be made available in a way that allows the same user experience typically related to traditional managed services falling in category 1. The “best effort” Internet, though, can hardly live up to these expectations, as even expanding the available “best effort” bandwidth would still not ensure that the level of performance expected by customers can be achieved at all times <sup>(42)</sup>.

Traffic management aimed at reducing pressure on the network is technically feasible and implies that part of a network’s capacity is reserved for the traffic demanding a higher standard, so as to ensure a high level of performance when the network is congested. However, traffic management needs to be reconciled with the non-discrimination principle (and the net neutrality one) to ensure that the ‘open’ Internet environment is not undermined (see section 5.2 below).

In Bahrain, Regulation no. 5 of 2008 issued by the Authority has established several duties on Licensed Operators in terms of compliance with specific QoS measurement requirements and QoS targets. As OTT players are not Licensed Operators they do not fall within the scope of application of this regulation.

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<sup>42</sup> M. Weldon, “*Managed Services Declaration Tia Comments – Open Internet Docket*”, available at [https://www.tiaonline.org/gov\\_affairs/fcc\\_filings/documents/Managed\\_Services\\_Declaration\\_01.14.10.pdf](https://www.tiaonline.org/gov_affairs/fcc_filings/documents/Managed_Services_Declaration_01.14.10.pdf).

## 5.2 Defining Net Neutrality

The “net neutrality” principle has emerged with increasing relevance along with the development of the Internet. Although there are several definitions of net neutrality, the underlying concept is generally construed with a twofold meaning. It refers to, on the one hand, the ability of end-users to enjoy full access to all the lawful content available on the Internet; and, on the other hand, to the absence of any traffic discrimination based on type, origin, destination, means of transmission, or content <sup>(43)</sup>. The combination of these two aspects results in a principle aimed at fostering “open” and accessible networks, while promoting the freedom of speech and information.

A strict interpretation of the net neutrality principle significantly reduces the role played by network operators, in that networks are looked at as mere “dumb pipes” through which the Internet traffic flows.

Some of the reasons that have been put forward in favour of this interpretation are the following:

- it rules out the possibility of any discrimination between certain types of content and political opinions;
- it promotes a level playing field between OTT players and applications, thereby overcoming fragmentation and preventing the creation of a “premium” Internet vis-à-vis “basic” Internet;
- it discourages coordinated behaviour among network operators, aimed at harming specific providers, or applications, or content by selectively interfering with the relevant traffic; and
- it allows small and start-up business to gain access to the network under the same conditions that apply to established organizations.

As a result of this interpretation, the net neutrality principle implies that blocking or hindering applications, as well as throttling or degrading of traffic, is not generally permissible.

As mentioned in paragraph 5.1.1 above, in the United States the regulatory framework on net neutrality recently introduced by the Open Internet Rules relies on this interpretation of the net neutrality principle <sup>(44)</sup>.

A more flexible approach to net neutrality is however possible, based on arguments such as the following:

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<sup>43</sup> See Directorate-General for Internal Policies of the European Union, “*Network Neutrality Revisited: Challenges and Responses in the EU and in the US*”, 2014 for a general overview of policy, economic and technical issues the heart of net neutrality debate.

<sup>44</sup> See the Open Internet Order published by the FCC on 13<sup>th</sup> April 2015, available at [www.federalregister.gov/articles/2015/04/13/2015-07841/protecting-and-promoting-the-open-internet](http://www.federalregister.gov/articles/2015/04/13/2015-07841/protecting-and-promoting-the-open-internet).

- Network performance is much more relevant to some online applications (such as VoIP, online gaming, videoconferencing, or real time online streaming) than to others, hence traffic prioritization/discrimination (absent anti-competitive behaviour) can be perfectly rational for both technical and business reasons for both OTT providers and network operators; this is all the more so for telepresence services (VoIP calls and videoconferencing), as they can hardly tolerate any latency at all.
- Increased data traffic on a perfectly neutral network may result in network operators being forced to increase cost of access for customers, as they would not be able to place these extra costs on OTT players. In fact, these latter enjoy sufficient bargaining power to be able to just leave a given network, should they be charged by the network operators. This would result in both end-users and the operators being worse-off
- Inability to discriminate between content can be problematic when the network is congested: in such circumstances, pure net neutrality prevents operators from prioritizing traffic so as to minimise inconvenience <sup>(45)</sup>.
- From a technical standpoint, the very concept of “network neutrality” is flawed, considering that, as already noted in paragraph 5.1(v), unmanaged IP networks are designed so as to continuously prioritize packets with the view to maximizing the use of shared resources; as a consequence, a technical regulation of “neutrality” would interfere with the very nature of how IP networks work.

Less strict interpretations of net neutrality combine a total ban on certain practices with transparency requirements explaining any ‘non-neutral’ practices such as selective network management to the end-users. For example, the EU Open Internet Regulation puts almost as much emphasis on the transparency and information measures as it does on the limit between the permitted and the prohibited activities of the service providers <sup>(46)</sup>.

Transparency and information requirements in both the advertising and the contracting stage of customer acquisition should be put in place in order to protect consumer welfare and facilitate demand-led competition.

Market dynamics have already to some extent led to solutions that challenge a strict interpretation of the net neutrality principle <sup>(47)</sup>. These solutions refer particularly to:

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<sup>45</sup> “A view of traffic management and other practices resulting in restrictions to the open Internet in Europe”, Body of European Regulators for Electronic Communications, 29<sup>th</sup> May 2012.

<sup>46</sup> See Article 4 of the Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015.

<sup>47</sup> Just very recently (2<sup>nd</sup> September 2015) Apple and Cisco announced a deal whereby Apple users will benefit from a fast lane on networks run by Cisco devices. As a result of this deal, Apple users will be able to connect to Cisco routers more easily, and Cisco devices will be able to manage traffic streams to and from Apple devices. See <http://hightechforum.org/apple-gets-a-fast-lane-and-the-fcc-cant-do-a-thing-about-it/>.

(i) blocking/throttling of specific technologies or applications; (ii) traffic management; and (iii) tiered pricing structures.

### **5.2.1 Blocking or Throttling of Specific Technologies or Applications**

An obvious way to radically fight OTT applications is for telecommunications operators to selectively block those applications which harm their own business the most, as they do have the technical means to do so. Alternatively, operators could just selectively degrade the traffic generated by specific applications (so-called “throttling”), thereby attaining similar outcomes.

Selective throttling should not be confused with throttling that may be experienced by users as a result of the implementation of “fair use” policies or data caps, or aimed at preventing congestion during peak hours. These measures do not imply differentiated treatment of traffic but rather constitute a technical measure of the traffic volume and provide a price signal to end-customers related to the cost of bandwidth consumption. Although blocking/throttling were sometimes adopted in the past within some jurisdictions, in most cases it has been eventually abandoned for various reasons <sup>(48)</sup>.

First, this strategy only proves successful if adopted across the industry. If one operator only was to adopt this approach, end-customers wishing to continue benefiting from OTT applications would probably switch to a competing operator that does not block such applications or use a so-called virtual private network (“VPN”) connection to bypass blocking/throttling policies (with ensuing issues in terms of the security of the telecommunications infrastructure). As a consequence, each operator may be reluctant to take the initiative first, which may encourage the industry to try and reach some kind of understanding on the matter. In addition operators are reluctant to harmonise their commercial practices since, understandings between network operators aimed at coordinating their behaviour against OTT providers may amount to collusive conduct (if not an abuse of collective dominance) capable of infringing antitrust rules as envisaged in most jurisdictions (including Bahrain, under Article 65 of the Telecommunications Law).

Second, OTT applications do not represent a temporary phenomenon that telecommunications operators should attempt to quash, but rather a new feature of the telecommunications industry that is driving a shift in the relevant business model. Hence, blocking applications will unlikely help telecommunications operators to successfully adjust to the evolving environment in the long run. Also, by blocking specific applications, telecommunications operators would only obtain – if anything – a temporary relief from the competitive pressure and revenues decline, as most likely a new OTT application similar to the old one would arise and overcome the block, thereby frustrating the purpose entirely.

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<sup>48</sup> Companies having blocked OTT communications in the past (particularly those providing VoIP services) include: Belize Telecommunications Limited, Telmex (Mexico), Etisalat (United Arab Emirates), Brazil Telecom, and Shanghai Telecom.

Third, blocking is typically seen as incompatible even with a less strict interpretation of the net neutrality principle underpinning the Internet, which most jurisdictions tend to safeguard, as it represents the ultimate form of discrimination. Any specific form of blocking at the network level, such as the blocking of advertising, would be included in this general ban<sup>(49)</sup>, even though it may be packaged as a value-added service for end-users. This is without prejudice to ad-blocking through browser plug-ins where the end-user exercises full control over it.

### 5.2.2 Traffic Management

An operator could spontaneously adopt internal measures aiming at reducing the impact of OTT applications on its own business by applying traffic management/prioritization policies<sup>(50)</sup>.

Internet traffic management is related to the allocation of a limited resource (available bandwidth) and hence therefore with the QoS and best efforts concepts (see paragraph 5.1 above). In the Internet environment, traffic management has more to do with design considerations than with discriminatory intentions. Either traffic is not managed, with performance of the network purely depending on current traffic load for all end-users, in compliance with the “best effort principle”; or certain traffic is prioritized by means of different possible techniques according to the relevant value (e.g. real time streaming traffic prioritized over other types of traffic) to ensure QoS. Traffic management could result in a few advantageous outcomes. Among other things, it could avoid a small number of customers using all the available bandwidth, thereby hindering access to the network by other users, and it would allow an allocation of the bandwidth that is consistent with the actual bandwidth requirements. Moreover, traffic management could reduce the pressure on the network, thereby preventing saturation and delaying the need for additional capital investments. Finally, it could also provide telecommunications operators with the opportunity to differentiate their business strategies and commercial offers based on the traffic management/prioritization policies applied, thereby departing from the “dumb pipe” situation in which many of them fear to be getting stuck<sup>(51)</sup>.

A version of traffic management is the practice known as “zero-rating”, whereby operators provide free access to specific online services (including streaming content

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<sup>49</sup> See Guideline no. 75 of the Draft BEREC Guidelines on the Implementation by National Regulators of European Net Neutrality Rules, June 2016 BoR (16) 94.

<sup>50</sup> Traffic management can also result in “throttling practices”, whereby the Internet service is slowed down with the view to reducing congestion. This form of throttling is typically experienced by users as a result of the implementation of “fair use” policies or data caps.

<sup>51</sup> Examples of operators having applied a reactive strategy include AT&T and Verizon (United States) that have phased out unlimited data plans and introduced tiered prices while launching their LTE networks. Orange (United Kingdom and France) and M1 in Singapore have been implementing traffic management on their networks by redirecting peer-to-peer traffic during peak hours or in case of congestion.

and social networks) as part of specific offers. Tariff discrimination could be applied in combination with traffic management/prioritization with the view to creating a number of packages for end-customers capable of satisfying different forms of demand.

However, traffic management needs to be carried out properly so as to prevent poor end-user experience and ensure that access to legal content is available to all end-customers, based on the generally applicable “best effort” principle.

As in the case of blocking, telecommunications operators might be tempted to reach express or tacit understandings leading to the application of traffic management policies in a coordinated manner – which would raise serious doubts as to the compatibility with antitrust rules and potentially result in significant fines. As a consequence, operators willing to adopt this strategy need to pay special attention to make sure that they act independently and – where a dominant position exists – that they avoid any abusive conduct.

Though traffic management is not a new practice (as traffic differentiation is inherent to the very structure of the Internet), it may give rise to some issues as to whether it is compatible with the net neutrality principle which, as already mentioned, envisages a non-discriminatory approach towards the traffic flow on the Internet.

As such, correctly applied traffic management would hardly even qualify as discriminatory, as differentiated traffic management would be applied to traffic that is not equal by its nature. In any event, non-discriminatory traffic management has to ensure compliance with competition and interconnection rules and implies that information is disclosed to end-users about network management practices in a clear manner. Also, a minimum standard should be ensured for all end-users (at least in the form of “best effort”): traffic management should not result in the downgrading of “basic” Internet traffic, but rather in the upgrading of “premium” traffic.

The line between efficient traffic management aimed at ensuring high quality services, on the one hand, and discriminatory behaviours aimed at selectively limiting specific applications, content, or players, on the other hand, could be very fine. An OTT provider with market power in a specific segment could attempt to expand that market power into upstream or downstream segments as other vertically integrated entities would do in the brick-and-mortar economy, thereby reducing competition and causing harm to consumers. Also, differentiation might lead network operators to slow down the basic Internet to force OTT players to pay extra for a fast lane. All these practices would likely result in a seemingly undesirable situation, where certain content would only be available on certain networks and, consequently, to certain customers. On the other hand, traffic management practices such as zero rating should not be presumed to be inherently anti-competitive to the extent that they are operator-initiated; where the decision to include certain content applications over others in a zero rating plan reflects the operator’s unilateral resolution so as to improve the value of its package.<sup>52</sup>

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<sup>52</sup>J. Eisenach, “The Economics of Zero Rating”, NERA Economic Consulting, available at: <http://www.nera.com/content/dam/nera/publications/2015/EconomicsofZeroRating.pdf>



Licensed Operators would therefore have to refrain from those traffic management practices that cannot be objectively justified, and that have as their object or effect blocking, slowing down, altering, restricting, interfering with, degrading or discriminating between specific content, applications or services, or specific categories of content, applications or services to the detriment of consumers or competition <sup>(53)</sup>.

### 5.2.3 Tiered Pricing Structures

Tiered pricing structures are quite common in several jurisdictions and imply that customers whose consumption pattern requires heavy data traffic are charged an extra fee for the extra traffic. By adopting this approach operators would charge add-on tariffs to users willing to use (certain) OTT applications, thereby generating new revenue streams and recovering at least partially the revenues loss associated with growing Internet-based communications <sup>(54)</sup>.

A particular tiered pricing structure is the practice known as “zero-rating”, whereby operators provide free access to specific online services (including streaming content and social networks) as part of specific offers <sup>(55)</sup>.

Tiered pricing structures allow operators to extract some extra value from those end-customers who use the network the most. On the other hand, end-customers seem to be willing to pay the minimal premium in exchange for the additional benefits that they receive. In this sense, add-on tariffs would appear to be economically rational as they would apply to the segment of the consumer market that value higher quality services more. Additionally, tiered pricing structures could be applied in combination with traffic management/prioritization with the view to creating a number of packages for end-customers capable of satisfying different forms of demand.

Tiered pricing structures may only be accepted under a more relaxed interpretation of the net neutrality principle, as they imply a differentiation in the economic treatment of the Internet traffic generated by specific OTT players or applications. This caveat has been raised by BEREC who deem as incompatible with equal treatment of traffic those zero-rating offers where all applications are blocked (or slowed down) once the data cap is reached except for the zero-rated application(s) <sup>(56)</sup>.

Some critics of zero rating have taken a firm stance against the practice, expressing that it conflicts with the principles of net neutrality by discriminating in favour of some content

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<sup>53</sup> See Recital 11 of the Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union.

<sup>54</sup> TeliaSonera, the network operator in Sweden and Finland, offers Skype only within certain data plans.

<sup>55</sup> Batelco, the main Bahraini operator, offers unlimited access to You Tube with certain add-ons only. Malaysian DiGi, 3 from Hong Kong and India's RCom have offered unlimited access to WhatsApp for flat fees.

<sup>56</sup> See Guideline no. 38 of the Draft BEREC Guidelines on the Implementation by National Regulators of European Net Neutrality Rules, June 2016 BoR (16) 94.

applications over others. Some also consider that such practices could harm market competition and consumer choice in the long run. Such criticism favours precautionary measures rather than innovation and experimentation.<sup>57</sup> Zero rating practices may not hinder the quality of service or access to content applications. While traffic management practices would allow for some applications to perform better than others, zero rating should leave those other applications fully functional. As a result, the Authority considers that zero rating practices can be economically efficient in terms of competitive product differentiation and lowered pricing, which in turn expands consumer choice rather than limit it.

The concept of tiered pricing has already been applied in other industries, including broadcasting (pay-TV), postal services and transportation, where end-customers can obtain an upgrade of the basic service by paying an extra charge. In this context, price differentiation is not regarded as discriminatory (absent any anti-competitive behaviour), as it is justified by the difference in the quality of service provided.

Add-on tariffs could allow telecommunications operators to generate additional revenues, while giving them some scope for differentiating their commercial offers. They might also help them find a commercial leverage to incentivize end-customers to use their own voice and messaging services. In this regard, add-on tariffs would be more transparent and less likely to be deemed anti-competitive if applied to specialised IP services such as IPTV or VPN i.e. services optimised for specific content, applications or services (<sup>58</sup>). Where these specialised services (<sup>58</sup>) are provided over the same infrastructure or wireless link as internet access, operators should not use the same bandwidth assigned to the internet access service, in order to avoid any deterioration of the internet access service (<sup>59</sup>). For example, an end-user subscribing to a 10 Mbit/s broadband internet service should not receive this service at a quality and speed that is worse in any way because they are at the same time subscribing to their operator's IPTV, VoD or VPN service.

Similar to the options discussed in sections 5.2.1 e 5.2.2 (referring to blocking/throttling and to traffic management practices respectively), telecommunications operators must avoid reaching any form of understanding to apply tariff discrimination practices in a coordinated manner to the detriment of specific OTT players or applications, as this would raise serious concerns in terms of compatibility with antitrust rules.

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<sup>57</sup> D. Brake, "Mobile Zero Rating: The Economics and Innovation Behind Free Data", Information Technology and Innovation Foundation, available at: [http://www2.itif.org/2016-zero-rating.pdf?\\_ga=1.31404280.673407722.1471851033](http://www2.itif.org/2016-zero-rating.pdf?_ga=1.31404280.673407722.1471851033)

<sup>58</sup> See e.g. Article 3(5) of the Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015.

<sup>59</sup> See Guideline no. 114 of the Draft BEREC Guidelines on the Implementation by National Regulators of European Net Neutrality Rules, June 2016 BoR (16) 94.

## **6 The Authority Conclusions: Allowing the Market Dynamics to Drive the Evolution of the Internet and Online Applications**

In light of the considerations set out in the previous paragraphs, the Authority has reached the following conclusions as regards how, in principle, the relationship between Licensed Operators and OTT players should be approached.

The Authority considers the current situation as a phase of an evolving environment that will ultimately result in a new structure of the telecommunications industry, at a global level as well as in the Kingdom of Bahrain. The Authority takes the view that this trend has been delivering significant benefits to end-customers in terms of availability of innovative services, access to diverse and free content, enhanced connectivity and communications opportunities. While creating new business opportunities for innovative players (such as OTT providers), in the Authority's view this evolving environment also encompasses new chances of growth for those Licensed Operators willing to embrace a new and still developing role.

As networks are going to play an increasingly crucial role for the development of the whole ecosystem, Licensed Operators are called to actively contribute to innovative and forward-looking initiatives.

The Authority believes that defining specific rules for an innovative and still evolving environment may lead to undesirable outcomes: stifling further innovation, limiting end-customer choice, and unduly influencing potential business relationships between Licensed Operators and OTT players. On the contrary, the Authority takes the view that market dynamics should, to the fullest possible extent, drive this structural shift, as such dynamics will further promote Internet penetration along with innovation, help control prices, and deliver benefits to end-customers. Market dynamics have been forcing both telecommunications operators and OTT players to explore new business formulae, thereby driving innovation in the industry and promoting developments that, until recently, would have seemed unattainable.

While sharing the general consensus on the idea that a neutral network should be promoted for the benefit of consumers, the Authority also acknowledges that a strict application of this principle could hinder the emergence of services depending to a high degree on transmission quality.

Accordingly, the Authority will, in principle, be amenable to accepting traffic management policies and limited tiered price structures as useful tools to foster Internet and OTT product penetration, by ensuring support to those services that require more network capacity to deliver an appropriate customer experience, and by adapting their offers to an evolving demand.

When examining the practices of Licensed Operators, the Authority will have particular regard to the following aspects:

- Access to legal content and applications available on the Internet should be ensured to end-customers in a non-discriminatory way; to this end, Licensed

Operators should clearly inform their end-customers about their traffic management practices, if any;

- Licensed Operators should ensure compliance with the “best effort” principle for the public Internet, i.e., for the data flow of non-managed and basic services; all traffic in the public Internet should be treated the same, regardless of content, service, application, origin or destination; the public Internet should not be downgraded;
- Traffic management policies may not be regarded as discriminatory as long as they do not result in targeted initiatives aimed at selectively degrading or favouring specific OTT services or players in an arbitrary and unjustified manner;
- Reasonable traffic management practices may include, for example: (i) managing congestion over the network; (ii) supporting the delivery of managed services; and (iii) ensuring that the obligations undertaken under consumer’s contracts are observed (e.g., download limits, data caps, etc.);
- Selectively blocking applications or degrading them to the point of preventing end-users from using them, or introducing any other non-price terms capable of making it excessively burdensome for end-users to use these applications, must be avoided;
- Transmission allocation should ensure that sufficient capacity is reserved for the “open Internet” to allow end-customers and OTT providers to enjoy non-discriminatory, transparent and open access to the Internet;
- Tiered pricing structures, including “zero-rating” practices, may be applied by Licensed Operators as an alternative to, or in combination with, traffic management policies, provided that access to legal content and applications available on the Internet is ensured to end-users in a non-discriminatory way in compliance with Article 58(b) of the Telecommunications Law;
- Tiered pricing structures should be limited and reasonable and need to reflect an actual extra-usage of the network, in compliance with Article 58(b) of the Telecommunications Law;
- Traffic management policies and tiered pricing structures, as well as the portion of dedicated bandwidth for managed IP services, should be disclosed to end-customers in a clear and transparent manner, and in a format that allows end-customers to compare different policies, along with typical Internet broadband download and upload speeds together with maximum achievable speeds; and
- When introducing traffic management policies and/or tiered pricing structures, end-customers should be granted the right to terminate existing agreements without penalty.

In this context, the Authority is committed to keep exercising its powers under Article 3 of the Telecommunications Law in order to protect the interests of end-customers and

promote effective competition among operators. The Authority will be particularly keen on ensuring that Licensed Operators comply with the principles established by Article 58(b) of the Telecommunications Law as regards the tariffs charged for Telecommunications services, which must be fair and equitable, non-discriminatory and based on forward looking costs. The Authority will also closely and continuously observe all activities in the telecommunications sector in order to timely identify and address anti-competitive conducts, under Article 65 of the Telecommunications Law.

While exercising its powers, the Authority is committed to monitoring:

- Developments in delivering transparent information to end-customers about traffic management policies, without prejudice to the possibility of intervening more formally;
- On-going compliance with the “best effort” principle to ensure Internet access to the general audience; and
- That the elements of end-customers’ contract are observed (e.g., data caps, download limits, heavy user policy, etc.).

The Authority will consider whether to propose to the telecommunications industry a voluntary code of practice supporting access to legal services available online and protecting against negative discrimination on the open Internet.