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# Agenda

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# The net neutrality debate

**Policymakers in Europe and the USA have recently made important proposals in the area of net neutrality that affect end-users, operators and providers, but these have sparked controversy. Marc Lebourges, Europe and Economics Regulation Director at Orange, explains the basis of this controversy and explores the insights that economic analysis can provide. He then presents the implications of the debate for network operators such as Orange**

In broad terms, 'net neutrality' is the principle that Internet service providers (ISPs) treat all data on the Internet equivalently, not discriminating by user, content, site, platform, application, type of equipment, or mode of communication. The new proposals affect the technical and economic relationships between Internet end-users, operators of telecommunications networks that support Internet traffic, and providers of content and applications on the Internet. These proposals have attracted extensive media coverage and have proved to be controversial on both sides of the Atlantic.

## What is net neutrality about?

The core of the debate lies in the 'openness of the Internet'. While this concept has not been precisely defined, there is currently a broad consensus on the need for an 'open Internet'. Technically, the Internet is a platform connecting different kinds of players: we have end-users on one side of the platform and Internet content and application providers (CAPs) on the other, while the platform itself is operated by a multitude of ISPs. Therefore, the concept of 'openness' can be envisioned as the freedom of end-users to access and distribute information and/or use the applications of their choice with the best possible quality of service; and/or freedom for CAPs wishing to provide end-users with access to their services under the best possible conditions.

Despite this consensus, two issues remain unresolved. First, should telecoms network operators be allowed to use technical measures to actively manage the traffic on their networks? If so, how much freedom and flexibility should they be afforded, given the underlying concern of protecting the relationship between end-users and CAPs from potential (unwanted) effects resulting from traffic management by ISPs, such as a reduction in quality or in the availability of specific content or applications?

Second, in terms of the economic relationships (i.e. prices and payment flows) between end-users, ISPs and CAPs that sustain balance and the growth of the Internet ecosystem, what is the optimal structure that will incentivise and justify new investments in networks to meet the increasing demand for bandwidth generated by the explosion of data traffic?

These are the issues and questions that policymakers in Europe are currently grappling with as they debate how to implement the European Commission's net neutrality proposals of September 2013.[1] These proposals addressed the protection of the open Internet by stating that ISPs could control the end-to-end technical characteristics of specific content, applications or services, provided that these 'specialised services' did not interfere with the general quality of 'best efforts' Internet access services.
In the first reading in April 2014 in the European Parliament, a significantly changed text was approved,[2] but debates on these issues continue, suggesting a lack of consensus between member states, the Council of the European Union and the European Parliament. Therefore, the final outcome of the legislative initiative is still uncertain.

Policymakers would benefit considerably from the insights that formal economic analysis has brought to this issue. These are covered briefly below.

## The economics of net neutrality

One of the most influential concepts regarding net neutrality is that of the informal theory of the 'virtuous circle' embraced by the US Federal Communications Commission (FCC) and based on the initial thinking of Dr Tim Wu, who first proposed the concept of net neutrality.[3] This theory considers that net neutrality encourages innovation 'on the edge' of the network, from CAPs. This innovation in turn increases the value of Internet access to end-users, who will thereby be willing to pay more for accessing the Internet. This creates a virtuous circle that supports investment in broadband infrastructure and innovation at the edges.

However, this reasoning is not fully supported by more formal economic analysis, and particularly the economic literature,[4] on two specific rules: the non-discrimination rule, which relates to the first debate on the freedom and flexibility of network operators; and the zero pricing rule, which relates to the economic relationships between end-users, ISPs and CAPs.

Economic analysis of the **non-discrimination rule** studies whether the ability of network operators to differentiate between high- and regular-quality offerings to content providers and end-users will lead to higher or lower investments. In the context of net neutrality analysis, the expression 'non-discrimination' is understood in its narrow sense: discrimination is identified with regard to any technical differentiation in the treatment of different types of traffic, whatever their respective quality of service requirements.

The conclusions of the analysis ultimately depend on whether the hypothesis behind the theoretical model supports the principle that genuine customer value creation may result from service quality differentiation (such as between time-sensitive and non-time-sensitive content), or if quality differentiation is only an artificial lever to generate price discrimination.

In the latter case, investment in capacity would improve the absolute quality of best-effort traffic and reduce the relative value of priority service, and thereby the value from discrimination—it follows that breach of net neutrality through discrimination would reduce investment.[5]

In the former case, as differentiation allows more consumer value to be provided and extracted from a given network capacity, differentiation would lead to higher revenues and therefore to higher investment.[6]

The **zero pricing rule** refers to the prohibition imposed on ISPs and network operators to charge CAPs for the traffic they send to end-users. Promoters of this rule consider this appropriate on the assumption that the extent and variety of content provision bring significant positive externalities to end-users, and that CAPs are also highly sensitive to the prices charged by network operators. This corresponds to a specific case of two-sided platforms, from which it can be concluded that welfare is maximised when the platform owner charges a positive price to one side of the platform (end-users) but does not charge the other side (CAPs).[7] This would be consistent with the FCC's informal 'virtuous circle'.

However, theoretical analysis of the impact of different assumptions concludes that the impact of a zero pricing rule on welfare is ambiguous and critically depends on the specific assumptions considered.[8] The policy implication of this finding is therefore a more flexible regulatory approach.

The economic rationale for strict net neutrality rules has been further undermined by recent developments in the economic literature studying the effects of the different pricing systems on the efficient use of network resources, as well as on the efficient consumption of services. This analysis builds on the fact that end-users do not control the quantity of traffic generated by their service requests, such as the technical format of the video they watch or the size of the attachments of the mail they receive. Users also receive large quantities of traffic that they do not actively seek, such as pop-up video advertising, or automatic updates or upgrades generated by their tablets or smartphones. In this situation, allocating all the network cost to the end-user and none to content providers generates two negative effects. First, CAPs are incentivised to behave opportunistically and generate an excessive quantity of traffic compared with what would be socially efficient, leading to negative externalities for concurrent network users.[9] Second, end-users have imperfect information on the price they would pay for the traffic generated by service consumption. This is because they cannot anticipate or control the quantity of gigabytes generated by their smartphone or tablet usage, leading to non-optimal levels of retail usage.[10] These inefficiencies can be mitigated or even eliminated if network operators are granted the right to allocate part of the network cost to CAPs.

More generally, the argument for a zero pricing rule is not without contradiction. In particular, it aims to reduce entry barriers for the 'two guys in a garage' wishing to launch a brilliant innovation by allocating all network costs to end-users in the retail market. However, the argument ignores that these 'two guys' generally start as retail customers of an ISP rather than as content providers, and will therefore not always benefit from the cost allocation implied by this rule.

The economic literature discussed above is mainly theoretical. In contrast, only one empirical study has focused on whether a telecoms operator facing strong competition in the retail broadband market would improve or reduce its turnover and profit by blocking access to certain Internet content in an attempt to promote the consumption of its own content.[11] This study finds that, given that the access revenue is an order of magnitude larger that the revenue variations related to specific content provision, such refusal to provide access would be a losing strategy. Thus this supports the idea that competition in the access market is sufficient to prevent breaches of the open Internet principle.

Finally, it should be noted that most of this economic analysis is also relevant for other Internet platforms including devices, operating systems, search engines and social networks. These findings should therefore apply more broadly to a range of Internet platforms.

## Open Internet in operation: Orange's perspective

Fixed and mobile broadband access to the Internet has been made quasi-universally available thanks to the commercial and financial initiatives of network operators such as Orange. Operators have been using technologies such as xDSL for fixed telephone access and 3G for mobile access, and, more

recently, newer mediums such as fibre and LTE (4G). Internet access speeds increase significantly several times a decade. Indeed, the telecoms industry invests well over 10% of its turnover each year, mainly to upgrade networks. Among infrastructure industries, the telecoms industry invests the most in Europe.[12]

Telecoms operators generally offer two categories of service:

- access to the Internet, which allows end-users to reach a wealth of innovative independent Internet services. This service provision is independent of network operation. As a consequence of this independence, however, operators cannot undertake end-to-end service management on the Internet. Consequently, traffic routing can only make the best use of the capacity that is available (also known as 'best effort' routing), and the customer experience may vary;

- specialised services that require specific performance levels, and for which network operators can make contractual commitments concerning customers' experience. Interdependence between the network and service is critical in order for operators to make such commitments. Typical services of this type include telephone, IP-TV services or virtual private networks for businesses. In the future, e-health applications or online gaming are examples for which there may be specific quality requirements provided by specialised services.

Specialised services and Internet access provide complementary value to end-users, and investments in networks provide benefits to both specialised services and Internet access. For example, investments in new networks for high-definition TV also improve the quality of video-streaming on the open Internet, thanks to the efficient management of a common infrastructure. Similarly, revenues derived from specialised services contribute to investments in the common network infrastructure, and lead to a more efficient use of bandwidth resources for a given usage, which ultimately benefits Internet access services.

In a competitive world, telecoms operators have to do their best for all types of services in order to retain and attract customers. However, not all customers have the same needs, use the same services at the same time, or have the same perception of affordability.

Dynamic network resource allocation allows these various needs to coexist on the same common infrastructure. Efficient traffic management is critical for providing high-quality services at affordable prices. In this respect, Orange considers that regulators should be concerned with the outcome from an end-user point of view—i.e. whether customers are able to benefit from high-quality Internet access and do not experience blocking of the services they demand. Regulators should therefore not interfere with the techniques of traffic management implemented by network operators, provided this outcome is reached.

End-users should be able to choose the Internet access service offer that best suits their needs. Customer segmentation and pricing flexibility at the retail level are thus key requirements. In addition, rapidly growing traffic levels have raised further concerns about the sustainability of the current Internet business model. We have recently seen major changes in the Internet ecosystem: a few powerful CAPs have developed activities that vastly increase traffic on the network (especially video). These providers, and their intermediary international transit players, use more and more network capacity but have no incentive to use it efficiently, as they do not contribute to investments required in the access network to support the delivery of the traffic they generate to end-users.

Ultimately, blocking and network congestion will be prevented if supply in capacity matches demand in traffic. Fundamental economic theory suggests that this result can be achieved only under a sound pricing system, where all users of the platform face an appropriate price signal (reflective of marginal costs) that incentivises efficient network usage.

Finally, network operators such as Orange consider that any serious consideration of the topic should take into account the Internet ecosystem as a whole.[13] We argue for a consistent legal framework to be applied to electronic communications services and other services that coexist with them on the Internet. Furthermore, it is important not to forget that Internet neutrality issues cover other parts of the Internet value chain, such as operating systems, search engines and app stores. This is why we fully support the increase in momentum in the public policy debate regarding Internet platform neutrality.

## Marc Lebourges

The opinions expressed in this article are those that the author considers appropriate for a telecoms operator such as Orange, and do not necessarily reflect the position of Orange.

[1] European Commission (2013), 'Proposal for a regulation of the European Parliament and of the council laying down measures concerning the European single market for electronic communications and to achieve a Connected Continent, and amending Directives 2002/20/EC, 2002/21/EC and 2002/22/EC and Regulations (EC) No 1211/2009 and (EU) No 531//2012', COM(2013) 627 final 2013/0309 (COD), 11 September.

[2] European Parliament (2014), 'European Parliament legislative resolution of 3 April 2014 on the proposal for a regulation of the European Parliament and of the Council laying down measures concerning the European single market for electronic communications and to achieve a Connected Continent, and amending Directives 2002/20/EC, 2002/21/EC, 2002/22/EC, and Regulations (EC) No 1211/2009 and (EU) No 531/2012', COM(2013)0627 – C7-0267/2013 – 2013/0309(COD), 3 April.

[3] Wu, T. (2003), 'Network neutrality, broadband discrimination', *Journal of Telecommunications and High Technology Law*, **2**, pp. 141–76.

[4] Schuett, F. (2010), 'Net neutrality: a survey of the economic literature', *Review of Network Economics*, **9**:2; Lebourges, M. and Saavedra, C. (2011), 'Lights and shadows from economic analysis on net neutrality and Internet pricing policies', *Communications & Strategies*, **84**, p. 75.

[5] See, for instance, Choi, J. and Kim, B.-C. (2010), 'Net neutrality and investment incentives', *RAND Journal of Economics*, **41**:3, pp. 446–71.

[6] See, for instance, Bourreau, M., Kourandi, F. and Valletti, T. (2014), 'Net neutrality with competing Internet platforms', CEIS research paper series, **12**:3, No. 307, February; or Baranes, E. (2014), 'The interplay between network investment and content quality: implications to net neutrality on the Internet', *Information Economics and Policy*, **28**, pp. 57–69, September.

[7] Economides, N. and Tâg, J. (2012), 'Net neutrality on the internet: a two-sided market analysis', *Information Economics and Policy*, **24**:2, pp. 91–104.

[8] Kourandi, F., Krämer, J. and Valletti, T. (2013), 'Net neutrality, exclusive contracts and Internet fragmentation', mimeo; and Krämer, J., Wiewiorra, L. and Weinhardt, C. (2013), 'Net neutrality: a progress report', *Telecommunications Policy*, **37**:9, pp. 794–813.

[9] This point is analysed in Peitz, M. and Schuett, F. (2013), 'Net neutrality and inflation of traffic', Chaire Innovation & Régulation, December.

[10] See Jullien, B. and Sand-Zantman, W. (2014), 'Pricing Internet traffic exclusion, signalling and screening', IDEI Working paper no. 735, February.

[11] Nurski, L. (2012), 'Net neutrality, foreclosure and the fast lane: an empirical study of the UK', mimeo, September.

[12] Fédération Française des Télécoms (2012), 'L'économie des Télécoms en France: deuxième étude pour la Fédération Française des Télécoms', press release.

[13] See, for instance, the joint declaration from the European industry at Digital Venice 2014, 'Making the right connections between industry and policy to deliver a better Europe', 9 July.