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Network neutrality

Report of the working group

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Summary

The report of the working group discusses the operation of the internet and outlines the core issues of network neutrality. It gives an insight into the situation in Switzerland and refers to developments abroad. At the centre of the discussion is the fact that today data on the internet can be transported in different qualities. Whether it is necessary and appropriate to treat all data equally is the topic of heated debate. One side points to the necessity of network management and calls for freedom in the design of its products; the other wants guaranteed equal treatment of all internet data, at least to the extent that discrimination against applications from competing service providers cannot occur. This report compares the arguments of the opponents and proponents of the possible rules for network neutrality, without making judgements. The positions of the various stakeholders are intended to pave the way for an objective discussion of the topic in a Swiss context.

1 Introduction

1.1 Background

The concept of network neutrality has emerged in the debate in relation to the extent to which network operators should be permitted to interfere with data transmission over the internet. Network neutrality is the principle according to which all data in transit via the internet is treated equally, independent of sender, recipient, service, application or content. It is designed to protect against discriminatory interference with traffic. Within the discussion there are many different opinions as to what interference should be permitted or prohibited and what exceptions should be permitted.

The internet is a network composed of many individual networks for transporting data. In each of these individual networks, the network operator decides whether it should treat all data to be transported within its network equally, or whether it prefers certain individual data to other data. To date, the internet has worked according to the "best-effort" principle: as long as transmission capacity exists within the network, all incoming data will be transported in the same way. Those who send content therefore do not need to conclude any agreements with the various network operators and internet access providers in order to reach recipients connected to the internet. This openness of the internet has made many innovations possible and opens up new opportunities for forming opinions and information delivery. The internet has therefore become a key socio-political and economic communication infrastructure.

The public debate on network neutrality began in the United States in 2003¹ and has been taken up all over the world. Proponents of legally enshrined network neutrality fear that without statutory network neutrality, the positive characteristics of an open internet could be lost. Their opponents argue that legal regulation could prevent improvements and innovations in the networks.

The regulatory authority in the United States, the Federal Communications Commission (FCC), has decreed regulations on network neutrality twice to date. In both cases, a court overturned these regulations due to the lack of a legal basis. In 2014, the FCC put forward new proposals for "open internet principles" and conducted a large-scale public consultation.

The EU has had provisions intended to protect network neutrality since 2009.² In April 2014, the European Parliament took the first step towards further regulation of network neutrality. The legislative process is currently underway.

1.2 Reason for the working group

The Federal Council set out its position on network neutrality to the telecommunications market in two evaluations in 2010 and 2012. The conclusion was that network neutrality requires greater scrutiny in an upcoming revision of the Telecommunications Act.

National Councillor Balthasar Glättli submitted Motion 12.4212 "Fernmeldegesetz. Gesetzliche Fest-schreibung der Netzneutralität" ("Telecommunications Act. Legal Definition of Network Neutrality") and Question 12.5198 "Netzneutralität auch in der Schweiz sichern" ("Guarantee Network Neutrality in Switzerland") in parliament. These were answered with reference to the evaluations and a more thorough scrutiny of an upcoming revision of the Telecommunications Act. In 2013 the digitale Nachhaltigkeit (Digital Sustainability) parliamentary group conducted an "open hearing" on network neutrality in the Federal Parliament Building. At this event the former CEO of Swisscom AG, C. Schloter, proposed that the telecoms regulator organise a dialogue for a common understanding of network neutrality. In

¹ Tim Wu, "Network Neutrality, Broadband Discrimination", Journal of Telecommunications and High Technology Law, Vol. 2, p. 141, 2003.

² cf. EU Commission Declaration of Network Neutrality, Official Journal 2009 L 337/69.

consultation with the Federal Department of the Environment, Transport, Energy and Communications (DETEC), the Federal Office of Communications (OFCOM) convened a working group, which met several times between October 2013 and October 2014.

1.3 Representation of stakeholders in the working group

Various groups are affected by the issue of network neutrality: the operators of networks for the transport of data, consumers, the major providers of services, applications and content over the internet, and their small competitors. Representatives of internet users, internet management and academics are also interested in the topic.

The working group's participants included the network operators Swisscom, Sunrise, Orange and upc cablecom, the associations asut, Swisscable and ICTswitzerland, the Stiftung für Konsumentenschutz (Foundation for Consumer Protection), the SRG (the largest content provider in Switzerland) and occasionally Teleboy (to represent the position of a small Swiss content provider). Internet Society Schweiz, /ch/open and Digitale Gesellschaft (Digital Society) represented internet users (the "online community"), Internet Society represented standards bodies for an open internet, and Switch represented network operators and internet management. Also among the representatives of the online community were members of a city parliament and the Swiss Parliament, although not in their capacity as members of parliament. The Secretariat of the Swiss Federal Communications Commission also participated, as did representatives from the academic world (Dr. Simon Schlauri³).

Google, swissICT, frc, Kf and ACSI all declined invitations to participate.

1.4 Aim of the report

This report is intended to illustrate the core of the debate on network neutrality, explain in simple terms the functioning, infrastructure and economic organisation of the internet, and provide an overview of the positions of the various stakeholders in Switzerland. It was edited by the Federal Office of Communications based on the input of the various stakeholders. Naturally, not all parts of the working group's report were shared equally by all the participants. Every participant was therefore given the opportunity to make separate comments in the Annex. The report is descriptive and does not evaluate the various options for action. The report does not therefore provide specific recommendations for action.

³ Habilitationsschrift: Network Neutrality: Netzneutralität als neues Regulierungsprinzip des Telekommunikationsrechts. 2010, Zurich / St. Gallen / Baden-Baden.

2 The internet

2.1 Functions and parties involved

The internet comprises many sub-networks. These sub-networks are operated by telecommunications service providers, other companies, schools, universities or public administrations (hereinafter also referred to as internet service providers or ISPs). All of these networks are connected to each other via the internet.

Internet end users can exchange data with each other via this network using sub-networks. This data can take the form of e-mails, videos, photos, web pages, etc. The data is sent back and forth between two people or companies based on the IP (internet protocol) addresses. The individual data packets in a single e-mail can be routed differently between sender and recipient. The data packets are then re-combined to compose the original e-mail in the recipient's system. Within the individual networks, routers ensure that the data packets are directed to the right place. The various stakeholders in the internet and their connections to each other are illustrated in the following (simplified) diagram:

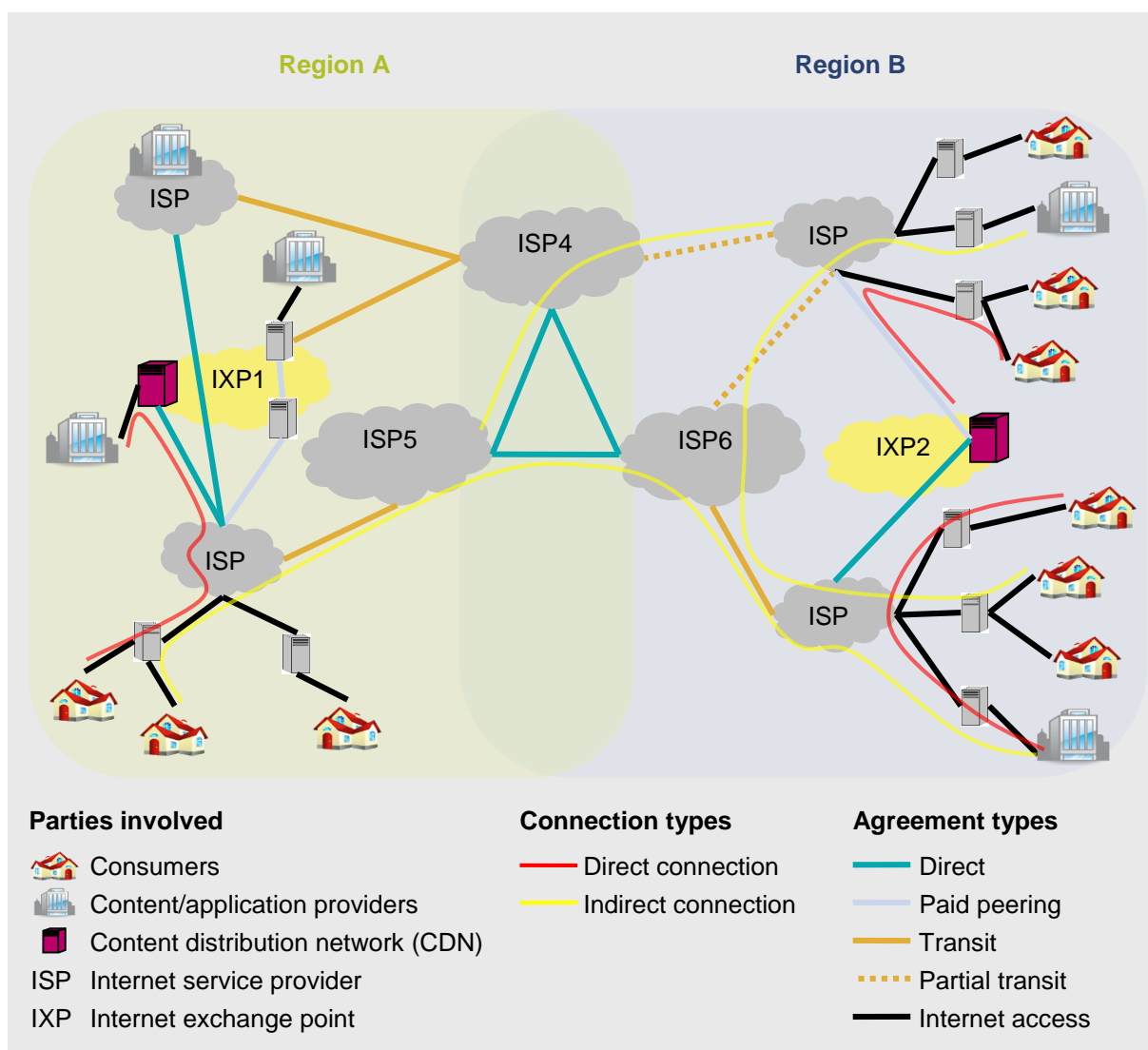


Figure 1 Schematic representation of the internet and the parties involved

Source: Own representation based on George Ou (2009, <http://www.digitalsociety.org/2009/11/fcc-nprm-ban-on-paid-peering-harms-new-innovators/>) and analysys mason (2012, <http://www.analysys-mason.com/internet-global-growth-lessons-for-the-future>).

The internet is used by the end user group, who in Figure 1 are divided in simple terms into consumers and (service), content and application providers (CAPs). The subdivision is simplified because

consumers also produce content and applications, while content and application providers can consume content and applications via the internet. A strict classification of end users into senders and receivers is often inappropriate because the end users increasingly assume both roles simultaneously ("prosumers" in the "Web 2.0"). For reasons of comprehension, however, the following will continue to refer to consumers when the focus is on consumption.

CAPs can offer their services, content and applications via their own servers or on content distribution networks (CDNs). CDNs bring CAP content closer to their customers and store this content locally for multiple retrieval. This means that content and applications are not sent all over the world for every request. This saves time and money for data transport and can improve the customer experience. A CDN is a network of widely distributed servers connected via the internet via which content (especially large media files such as films, etc.) can be delivered. This enables CDNs to effectively guarantee CAPs that their services and content are received by end users in good quality.

ISPs can interconnect their networks at private locations or specially established national and international internet hubs (internet exchanges [IXs] or internet exchange points [IXPs]). An IXP merges multiple ISPs so that they can connect their networks with relatively little effort.

There are various common types of agreements for this connection; these are described below.

2.2 Connecting individual networks

Two sub-networks A and B of the internet can essentially be connected directly or (typically) indirectly (IP interconnection).

- Direct connection: Network A ⇔ Network B
- Indirect connection: Network A ⇔ Network C ⇔ Network D ⇔ Network B

In order for data that is stored or retrieved by an end user (e-mails, videos, documents, websites, etc.) to reach the desired counterpart, a large number of connections is often necessary. The conditions under which the ISPs directly interconnect their networks are regulated in interconnection agreements. The various possible interconnection agreements can be divided into "transit" and "peering":

- Transit is the traditional way in which network operators ensure accessibility to the entire internet for their customers and in which CAPs purchase access to the internet. ISPs are paid to ensure the connection to all other sub-networks of the internet. This is true for both incoming and outgoing data. In Figure 1 for example, ISP3 pays the network (ISP5), which handles its traffic. Transit is the simplest way for a network to gain access to the internet in order to become part of the internet itself. Figure 1 illustrates a special form of transit: partial transit. This is where an ISP purchases only a part of the possible range from a transit provider. ISP1 has a partial transit agreement with ISP6 to reach the network of ISP2. However, ISP1 uses the transit offer of ISP4 to reach ISP3.
- Peering is a specially constructed and equipped direct connection between two networks. The connection is limited to data traffic between the customers of these two networks. To directly connect networks, they must be present in the same geographical location: often an IXP. In contrast to transit, peering requires additional infrastructure. Figure 1 illustrates peering agreements between ISP2, ISP3 and the CDN as well as between ISP4, ISP5 and ISP6. Peering agreements are typically concluded free of charge if the two networks involved receive approximately the same benefit from the direct connection. If the two networks send each other differing amounts of data, it is possible that the two network operators will renegotiate the conditions of their interconnection agreement and arrange paid peering. This essentially has the same properties as peering, but one ISP pays the other ISP a certain amount for the transmitted data. A paid peering agreement can be negotiated without prior peering agreements. In

Figure 1 this could be the case between the CDN (which is paying) and the broadband ISP1 (which is being paid).

2.3 Value chain / cash flow on the internet

The stakeholders in the internet are connected in a complex network of international relationships. Nevertheless, it is possible to roughly identify three market areas:

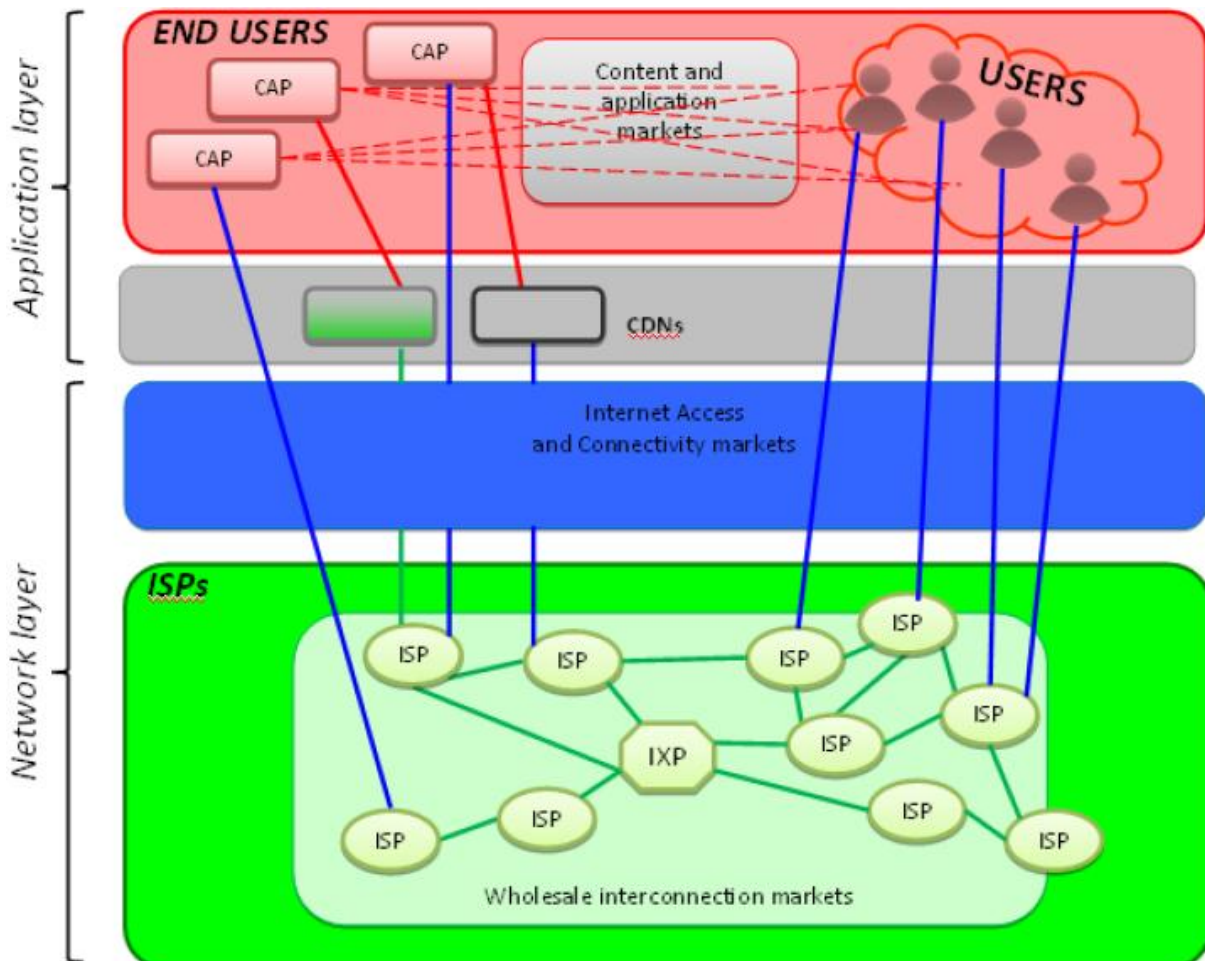


Figure 2 Market relations on the internet

Source: BEREC (2012), An assessment of IP Interconnection in the context of Net Neutrality, BoR (12) 130.

At the end user level there are markets for content and applications. Users (see Figure 2) and CAPs meet in dynamic sub-markets. Possible examples include the market for encyclopaedias (with Wikipedia), the market for internet telephony (with Skype) or the short message services (with WhatsApp). In Figure 2, the device manufacturer (e.g. the producers of smartphones), which complement this market area, are missing.

In the internet access and connection market, ISPs sell internet access to end users (see Figure 2). Providers of content and applications often also purchase services for worldwide distribution of content (content delivery networks [CDN]) as well as internet access services. Major providers of content and applications such as Google, Amazon and Facebook construct their own CDNs. This relieves pressure on backbones and brings the CAP's data closer to the ISP users at the cost of the CAP.

Connections between the various ISPs and CDNs take place in the market for interconnection. The IXP role is as an intermediary. Until a few years ago, international backbones were the mainstay of the

global internet. These backbones include undersea cables between continents and are operated by various companies. In times of rapidly increasing volumes of data, there are more and more global companies which construct this part of the infrastructure themselves, thus bypassing the international backbones and connecting directly to the destination networks. This means that international backbones lose importance and new (gigantic) corporate networks arise. Global companies like Google, Facebook, Microsoft and IBM have operated their own server farms for many years. They have now started to construct and operate the connections between these server farms and to other networks themselves. To do this they have even laid their own undersea cables⁴, which connect continents.

The entire value creation process on the internet covers all these areas. It is possible that a company both operates a network - with or without end customer access - (role of the ISP or CDN) and provides applications or content (role of the CAP). Examples of such vertically integrated companies in Switzerland are Sunrise, Swisscom and upc cablecom.

It is indicative of the value creation process on the internet that the value chain functions as a kind of control loop. End users pay their internet service provider so that they have a basic internet connection. This allows CAPs to generate revenue through the sale of content, applications and advertising on the content and application market. The diversity of the services and content offered in turn ensures that users demand a larger number of faster internet connections. This increases the turnover of network operators and CDNs and provides CAPs with new opportunities to develop and sell content and applications. The following (simplified) graphic illustrates these cash flows and relations.

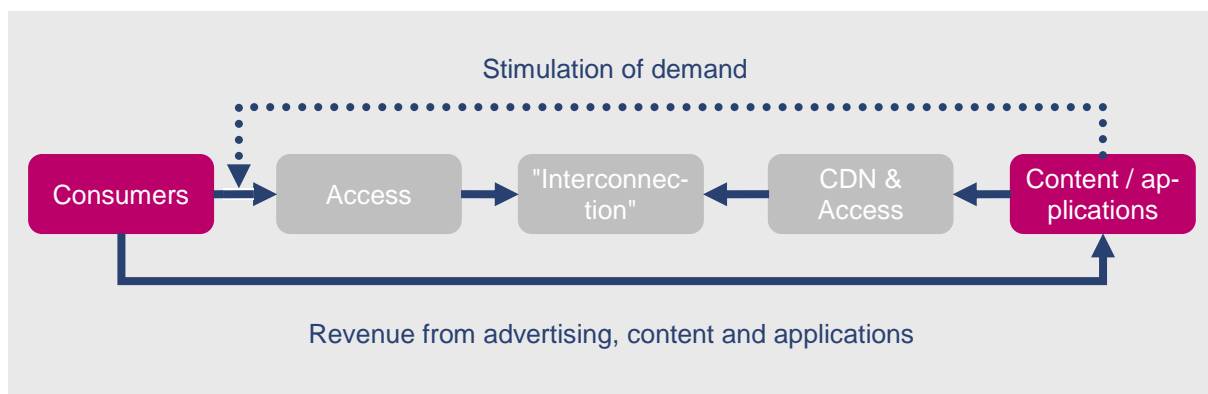


Figure 3 Value creation process on the internet

Source: Own representation based on: Plum (2011). The open internet – a platform for growth.

2.4 Data transmission and the "best-effort" principle

During transport via the internet, data packets are processed and forwarded to various intermediate stations ("routers"). If more data packets are sent to a router than can be forwarded within the available capacity ("best-effort") data packets must be discarded ("packet loss"). For some services (e.g. e-mail, web), this loss usually has no consequences other than a time lag in data transmission. In contrast to this, the quality of quality-sensitive services (e.g. voice telephony, internet television and video telephony) can fall significantly for customers and may even lead to failure of the service.

⁴ <http://www.techinasia.com/new-submarine-cable-can-support-3-million-high-def-internet-videos-simultaneously/>

3 Key issues

3.1 Importance of the internet

Over the last two decades the internet has grown to become the world's largest data transport network and an indispensable communication platform. It offers all its users innumerable possibilities, regardless of whether their role is as a consumer, service provider or citizen (i.e. a participant in political discussion). These opportunities can be exploited without major obstacles.

3.1.1 Innovation in a global market

The success of the internet is based on the fact that anyone who is connected to the internet can use content, applications and services via the internet and at the same time also provide services him- or herself. The internet therefore creates a global market where customers and providers of content, applications and services meet. If someone wishes to offer content, applications or services via the internet it is not necessary to ask all operators of different parts of the internet for permission ("innovation without permission"). The internet is open to all service providers and users of legal content, applications and services ("open internet").⁵

These opportunities have been exploited by many innovative individuals with limited financial means ("two boys in a garage"). This has led to a variety of different services. All internet clients and customers worldwide have been able to decide independently whether they wish to use the services of these individuals (or of the company founded by them). In this decision they were independent of their internet access providers, because intervention by internet access providers in these services was practically impossible (the technical possibilities for such intervention have expanded in recent years). Today, many of these services are used worldwide. Well-known examples include Google, Facebook and YouTube. Some examples from Switzerland include Teleboy, Doodle, Zattoo, Wilmaa, Jilion and Watson.

The fact that these companies were based on the openness of the internet when they began their activities means that according to estimates⁶ every year there are now approximately 4,000 start-ups in the area south of San Francisco ("Silicon Valley") alone. There is also a growing start-up scene in Switzerland, particularly because Switzerland has become a coveted location for data-intensive services. In more and more industries a growing part of value creation and communications is via the internet. The internet can offer SMEs in Switzerland the opportunity to remain innovative in global competition and to open up new markets.

3.1.2 Political rights and fundamental freedoms

The opportunity for every person to express his or her views to an unlimited number of potential listeners and to gain information from an unlimited number of sources is also a significant political achievement. It strengthens the freedom of expression and freedom of information of citizens as well as the freedom of the media. The Council of Europe, for example, refers to the internet as a platform to participate in political processes and democratic control.⁷ The internet is therefore important for society and politics.

⁵ Unlike the internet, many devices and operating systems are not accessible to all providers of applications or content.

⁶ Marc Andreessen, Stanford University Talk, 4 March 2013 <http://www.gsb.stanford.edu/cldr/events/vftt.html>

⁷ Declaration by the Committee of Ministers on Internet governance principles: Principle 9. Open network: Users should have the greatest possible access to Internet-based content, applications and services of their choice, whether or not they are offered free of charge, using suitable devices of their

For the media, the internet is both source and core means of distribution. Almost all media publish or transmit some of their content via the internet. The more important the internet becomes for social communication and information, the more important it becomes for the distribution of media content. The open internet allows new, especially small media companies, to make their voices heard. It guarantees technically equal opportunities to reach consumers. In this respect, an open internet also ensures journalistic diversity. This diversity is a prerequisite for ensuring the fundamental rights of freedom of expression and information.

From a national policy-making point of view, the objectives of network neutrality are fundamentally the same as those of the "must-carry obligations" in radio and TV broadcasting. However, they also serve other means. "Must-carry obligations" ensure that radio and TV broadcasters offer a limited number of programme services deemed socially valuable. Network neutrality safeguards equal opportunities in relation to the technical availability of the audience.

3.2 Quality differentiation

3.2.1 Interference in relation to data traffic

In the course of the development of the internet, techniques have been developed which allow operators of the sub-networks which comprise the internet to transport different data with different quality. Good transportation is fast, uniform, reliable. Poor transportation is slow, irregular and relatively unreliable (higher delay, jitter and packet loss). Interference with traffic is considered unproblematic if it is organised by an authority or a court with a legal basis or if it fends off attacks on the network or its customers (e.g. "malware" and "ddos attacks").

3.2.2 Internet and specialised services

In addition to access to the internet, many network operators also offer their customers content and services themselves, e.g. their own TV services (coupled with other services such as video-on-demand and service apps with news, sports and games). They usually transmit such content and services via the same broadband connection they use to send internet data to end users. However, they transport them separately from the open internet via their own networks. These networks are rarely established on separate lines (= physically separated). Usually the content and services function on the same lines as the internet, but according to other rules for data transportation (= logically separated). The network operators control the quality of, and access to, these separate, specialised services precisely, so that they can ensure the guaranteed quality for their customers and sell the appropriate services on the market.

choice. Traffic management measures which have an impact on the enjoyment of fundamental rights and freedoms, in particular the right to freedom of expression and to impart and receive information regardless of frontiers, as well as the right to respect for private life, must meet the requirements of international law on the protection of freedom of expression and access to information, and the right to respect for private life.

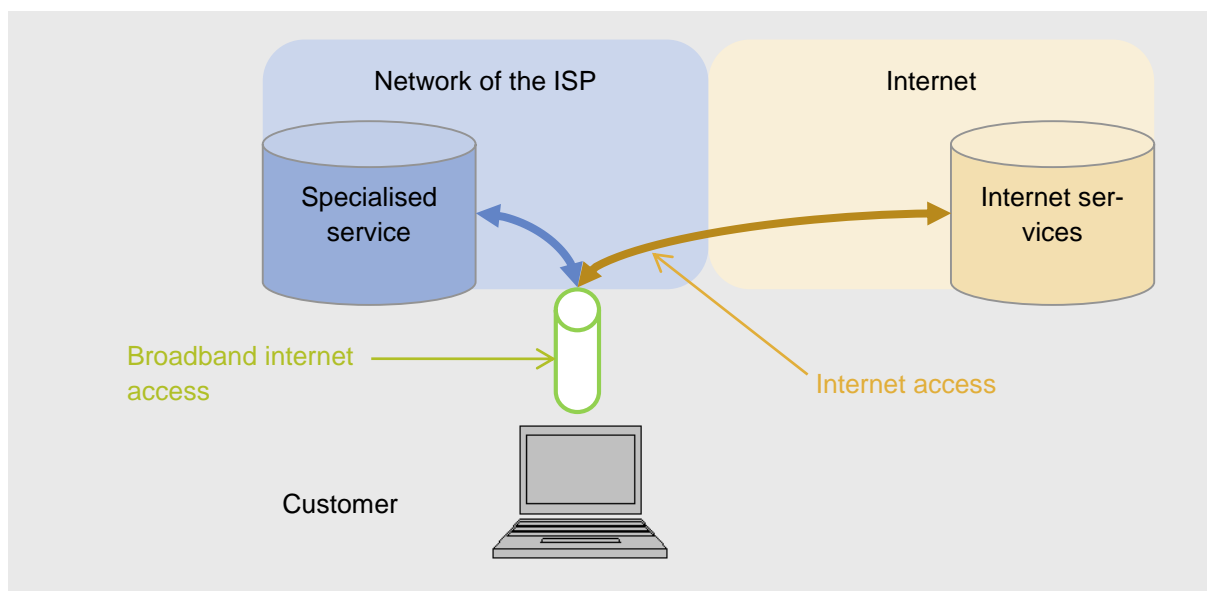


Figure 4 Schematic representation of the discussion regarding internet services and specialised services

Source: own representation.

3.2.3 Quality differentiation opportunities

With quality differentiation and specialised services via broadband connections, fundamentally new opportunities have opened up to network operators. The motives which are in theory available to network operators for handling the transportation of data to their customers are illustrated below:

They could, for example, use the differentiation of data transmission to ensure the quality of internet services by introducing and expanding systems to control data traffic. Under certain circumstances this could reduce investment in the expansion of router and other core network capacities ("overprovisioning").

Network operators could also use the differentiation of data traffic to provide different customer groups with different qualities of the services offered in a customised manner. One example is if an ISP has internet access in its product portfolio which is cheaper than others, but excludes the use of certain applications (e.g. WhatsApp or Skype). However, it is also possible for an ISP to require a fee from its customers for high-quality voice over IP (VoIP) transmission and to block internet telephony if the customer fails to pay the fee.

Furthermore, given appropriate market power, the differentiation of data allows network operators to demand payment from providers of content, services and applications who are connected to the internet with other network operators for transport to their customers.

By transporting their own services or those of commercial partners in good quality, network operators can differentiate their own services (e.g. video-on-demand or SMS) or protect those of commercial partners against competing internet services such as Google, Facebook, Skype, WhatsApp or YouTube. Alternatively, it is possible for vertically integrated ISPs to reduce the quality of their internet services to move their existing own customers to purchase other services (in particular good internet transport or their own specialised services).

Arguments of the opponents of network neutrality regulation	Arguments of the proponents of network neutrality regulation
<ul style="list-style-type: none"> • The openness of the internet makes it attractive and successful. Network operators are aware of this. • The high competitive pressure would punish wrongdoing immediately. • The internet has developed without regulation and mastered all the challenges to date without bureaucracy. • Network management is essential for optimum network utilisation and other innovations. <p>Today, a network operator in Switzerland cannot afford to block or discriminate against services such as Google, Facebook or Skype. Customers expect that these services will be available and can be used in high quality. A network provider which blocks or reduces the quality of these services harms itself in terms of competition for customers.</p> <p>The increasing variety of services (in addition to increasing quality and decreasing prices) clearly shows that in a liberalised market the issue of network neutrality becomes effective through competition. Additional legislation is unnecessary.</p> <p>It is only with their networks that telecommunications service providers and ISPs allow access to the free internet and create the opportunity for end users to use any services they wish and for service providers to reach end customers. Their investment makes ISPs enablers rather than preventers.</p> <p>The internet is central to both the social and economic development of the country. Swiss ISPs have made this development possible by economically meaningful, long-term investment and will continue to do so. This infrastructure is available to all market participants. Anticipatory regulation of this public interest infrastructure would not only be wrong, it would also hinder innovation and Switzerland might even be cut off from important new developments and business models.</p>	<p>Protection against technical and economic discrimination is important particularly against the background of more and more network operators offering their own or purchased content and services. In this case, network operators do not only have an obvious economic interest, but also the option of favouring their own services. They can do this by using better quality when transporting these services or by not counting data retrieved by customers for proprietary services as part of monthly data caps. Such practices are already established in Switzerland.</p> <p>The advantages of the internet are limited when opportunities to control traffic are not used in accordance with the long-term public interest. The internet is a communication infrastructure which is central to society and of major significance in terms of national policy. It is an important basis for the economic, cultural and political development of society.</p> <p>It is impossible to deal with the associated risks using competition law. Specifically, competition law was not designed to ensure freedom of information, diversity of opinion or media pluralism. Consequently, it will not prevent society-relevant failures on the internet.</p> <p>Network operators can easily continue to fund the necessary expansion of their infrastructure with revenue from their own end customers. This is supported by the fact that to date the steady growth of transported data has been offset by performance gains and price reductions for the equipment used in the networks. Network neutrality wishes to receive incentives which ensure the best possible, demand-based development of the networks.</p> <p>Furthermore, the increasing demand for higher bandwidth allows network operators to influence their revenues using appropriate pricing plans for their customers. It is paradoxical that network operators compete using flat rates while continuing to maintain that there are daunting capacity constraints.</p> <p>The opportunities for quality differentiation at the service level set false incentives. The prospect of additional revenue may therefore motivate</p>

Arguments of the opponents of network neutrality regulation	Arguments of the proponents of network neutrality regulation
<p>Creating and marketing product bundles and offering your own services is not only part of the constitutionally guaranteed freedom of economic activity; it also forms part of economic ideas competition and associated innovation. It would be wrong to reduce or prevent this part of the internet's ability to innovate. Forgoing regulation means that new business models can be developed in Switzerland and/or be imported.</p> <p>Controlling network traffic makes sense in technical and (national) economic terms. The current extent of additional control requirements depends on the network architectures used. A network that is sized to the maximum peak load results in massively increased costs and a large amount of unused capacity during most of the day. From a national economic perspective, it is therefore ideal if there is optimum use and demand-based expansion of limited transmission capacity. In the road transport sector, traffic management is also used to prevent further, very expensive expansion of the road network. For economic reasons it is therefore sometimes necessary to deviate from the "best-effort" principle. Only in this way can, for example, the transfer of quality-sensitive services be meaningfully accomplished.</p> <p>The transition to the IP world cannot take place without traffic management. Only in this way can telephony, television and internet services be pooled together without reduction of quality and produced in the same frequency band as IP services. Dynamic separation mechanisms at the IP level help to maintain the quality of telephony, television and other time-critical services. A beneficial side effect is that an application such as television will no longer be allocated dedicated bandwidth and, given scarce access bandwidth, internet services can use TV bandwidth. This means that not only network expansion but also</p>	<p>ISPs not to expand internet access so that content providers are willing to pay for specialised services or better transportation. Such business models can only generate income if capacity is limited. Business models which are based on capacity bottlenecks should therefore be prevented.</p> <p>The primary interest of ISPs is not the efficient use of their networks; instead they wish to retain their freedom to introduce such business models, or extend existing ones, at will. In this way they can force the providers of content and applications to pay for faster access. In the United States, Netflix's data was slowed down in order to force Netflix to pay for access⁸. As soon as individual providers pay, others must follow suit in order to stay competitive. Smaller content providers can be left standing by financially strong international providers.</p> <p>Differentiation of data traffic is also unnecessary. Equal treatment of data traffic can ensure adequate quality of internet services in the face of increasing traffic through the expansion of network capacity and capacity of interconnection interfaces. This is illustrated by the experience of two networks used by universities (Internet2, USA⁹ and Switch, Switzerland¹⁰). These ISPs have noted that the mere existence of sufficient capacity means that it is possible to provide cheaper transport quality in their networks without data being treated differently.</p> <p>However, the concept of network neutrality does not require that network operators size networks to any conceivable peak load. Given the current infrastructure options, a reasonable, demand-based expansion of networks will ensure that capacity bottlenecks remain temporary phenomena. If temporary bottlenecks occur, the concept of network neutrality means interference with traffic is conceivable if it is technically and economically non-discriminatory. Furthermore, it is</p>

⁸ <http://www.nzz.ch/international/amerika/das-internet-eine-zweiklassengesellschaft-1.18341846>

⁹ <http://www.internet2.edu/presentations/2006/20060207-GaryBachula-Testimony.pdf>

¹⁰ Statement by the representative of Switch in the network neutrality working group.

Arguments of the opponents of network neutrality regulation	Arguments of the proponents of network neutrality regulation
<p>traffic management in the IP world make increased bandwidth possible for internet services.</p> <p>Swiss network operators invest billions in network expansion every year to cope with rapidly increasing traffic and avoid bottlenecks. However, network congestion is always possible. In such cases, it must be possible to prioritise time-critical services and applications to ensure they function properly. Qualitatively differentiated transmission is therefore indicated for each data type. It is also essential to ensure for example that emergency calls reach the recipient even in the case of network congestion.</p> <p>Transport capacity is not infinite and network expansion is not free. There are therefore good economic reasons for such traffic management. If it proves that efficient traffic management, e.g. prioritisation of time-sensitive data over less time-sensitive data is <i>ceteris paribus</i> cheaper than additional capacity expansion, it would be economic suicide to further expand the network.</p> <p>Differentiation based on network technology is therefore inevitable and, in view of increasing traffic, can help avoid capacity bottlenecks. Particularly in the access network for mobile telephony, the physical constraints are such that it is not possible to oversize the network capacity. Furthermore, the capacity is also severely limited due to the Ordinance on Protection against Non-Ionizing Radiation (NIRO, SR 814.710).</p> <p>Content delivery networks (CDN) offer CAPs guaranteed transmission quality and effectively prioritised data transport at a fee. Larger CAPs construct their own networks in order to ensure a good quality of data transport. The legend of the so-called neutral internet, in which all data is treated the same, is therefore already a fairy tale today. The internet cannot and never will be as neutral as the term network neutrality suggests.</p>	<p>possible to define this in the framework of regulation.</p> <p>It should be remembered that every attempt to introduce quality classes which work on the internet across multiple sub-networks has failed because the associated costs are excessive and the interests of the parties too different. Current experience shows that quality-sensitive services work very well even over best-effort internet access.</p> <p>It is not appropriate that content and applications providers (CAPs) pay twice for the transmission of their data. They currently already pay for access to the internet. Specifically, they pay for local internet access and data transport services. There are therefore strong incentives for them to develop innovative technologies to reduce the volume of data. It is not correct to represent them as the source of the traffic, because the data they provide is required by the consumers. It is only the variety of content and services which lead consumers to pay for internet access. This diversity is threatened if network neutrality is violated, because lenders assess the chances of success of start-ups in an open internet as better.¹¹</p> <p>Indeed the practice in today's Swiss mobile communications sector, whereby the data of certain content providers does not count towards a customer's data cap, can lead to more, rather than less data traffic.</p>

¹¹ Venture Capitalist Fred Wilson (Union Square Ventures): "Many VCs such as our firm would not invest in the mobile Internet when it was controlled by carriers who set the rules, picked winners, and used predatory tactics to control their networks. Once Apple opened up competition with the iPhone and the app store, many firms changed their approach, including our firm.", Source: <http://www.theatlantic.com/technology/archive/2014/05/the-case-for-rebooting-the-network-neutrality-debate/361809/>.

Arguments of the opponents of network neutrality regulation	Arguments of the proponents of network neutrality regulation
<p>There is no reason why network operators should be prevented from prioritising certain data if this is already practised by CDNs and CAPs today. Such a measure would greatly distort competition to the detriment of network operators.</p> <p>Network-to-network data transport (transit and peering) does not take place in Switzerland but internationally. Swiss jurisdiction in this respect would depend on ISPs in Switzerland and exclude international providers. It would, for example, be questionable whether large CDNs would continue to operate caching servers in Switzerland.</p>	

3.3 Commercial differentiation

ISPs can also differentiate internet access commercially, independently of technical differentiation in relation to data transfer. An example of commercial differentiation is a subscription which limits the use of the internet to a certain volume of data, but excludes some services ("out of cap"). The use of an internet TV application, for example, might not count towards the data cap, whereas comparable competing services do.

Another example is a foreign ISP (AT&T) which allows CAPs to pay for data transfer instead of the end users themselves. As a result, CAPs can reduce the data volume consumed by customers of this ISP ("sponsored data"). Consumption of "sponsored data" content and applications does not affect a subscriber's data cap.

A representation of the arguments for and against commercial differentiation can be found in Section 4.4. It is not possible to sharply separate commercial and technical differentiation of data transfer.

4 Situation today

4.1 Data location

Very comprehensive data on obstacles to internet services during internet transport in 32 European countries including Switzerland is available. It is based on a survey of 32 European regulators covering 414 providers of telecommunications services, which cover 90% of the market in their respective countries. 140 million fixed and 200 million mobile internet users are recorded. The data comes from a comprehensive report of the Body of European Regulators for Electronic Communications (BEREC) from 2012.

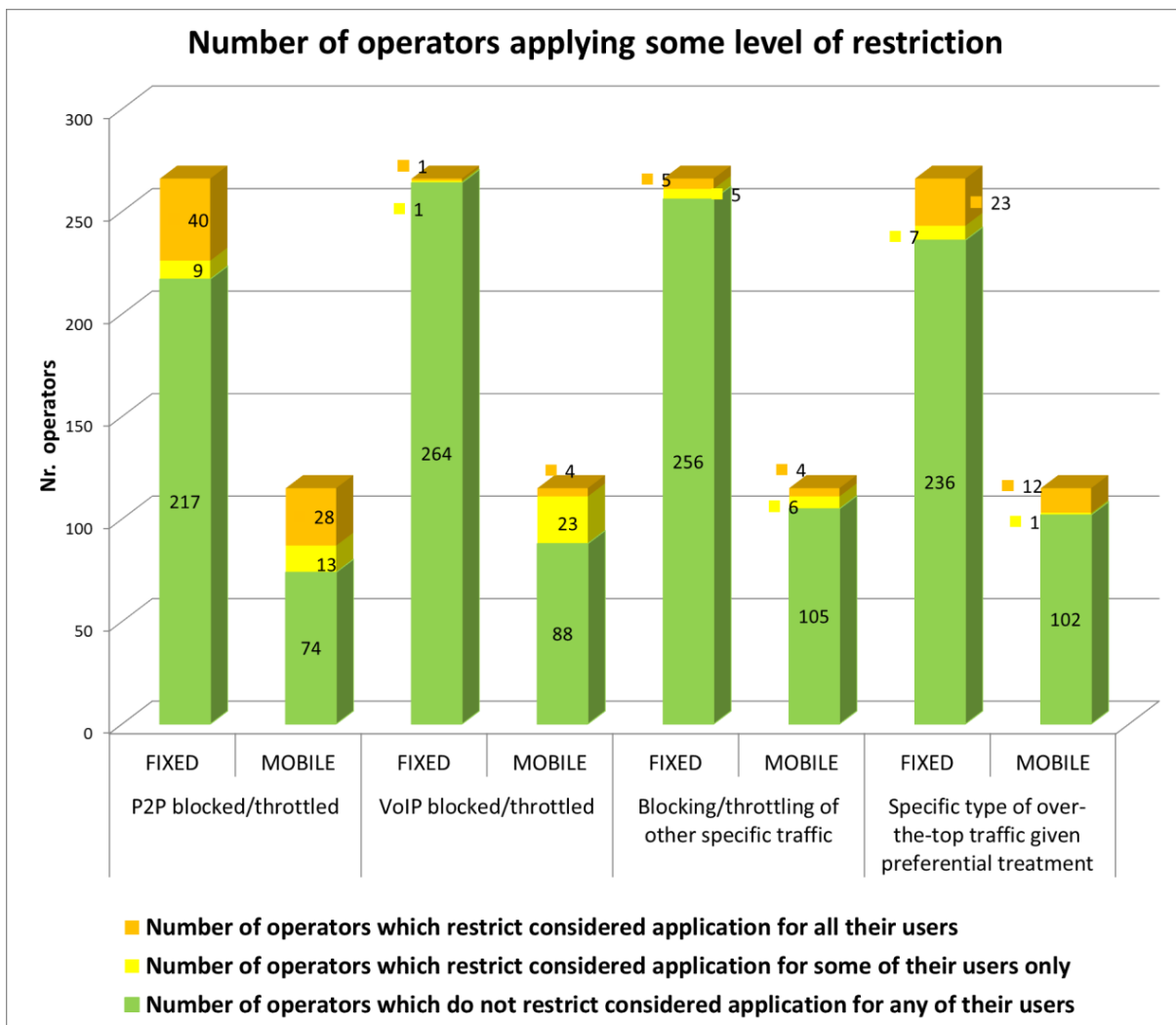


Figure 5 Number of providers which do not, sometimes or entirely restrict the use of internet services

Source: BEREC (2012), A view of traffic management and other practices resulting in restrictions to the open Internet in Europe, BoR (12) 30, Graphic 3.

In Figure 1 it can be seen that of 266 providers of fixed internet access, 40 (15.0%) examples of peer-to-peer traffic (P2P) are blocked or restricted. 9 (3.4%) of 266 providers of fixed internet access block or restrict P2P for some of their subscribers. Of 115 service providers of mobile internet access, 13 (11.3%) block or restrict P2P for some of their subscribers and 28 (24.4%) do so for all subscribers.

In the fixed network, only one provider blocks or restricts VoIP (e.g. Skype) for all their customers and only one other blocks or restricts VoIP for some of their customers. In the mobile network, VoIP is blocked or restricted by 4 (3.5%) of the 115 surveyed providers for all of their customers and 23 (20.0%) of service providers for some of their customers.

Other specific traffic which can be restricted includes file sharing such as FTP or shared file access.

23 (8.7%) of 266 fixed network operators give preferential treatment to certain internet traffic. 7 (2.6%) fixed network providers prioritise certain internet traffic for some of their customers.

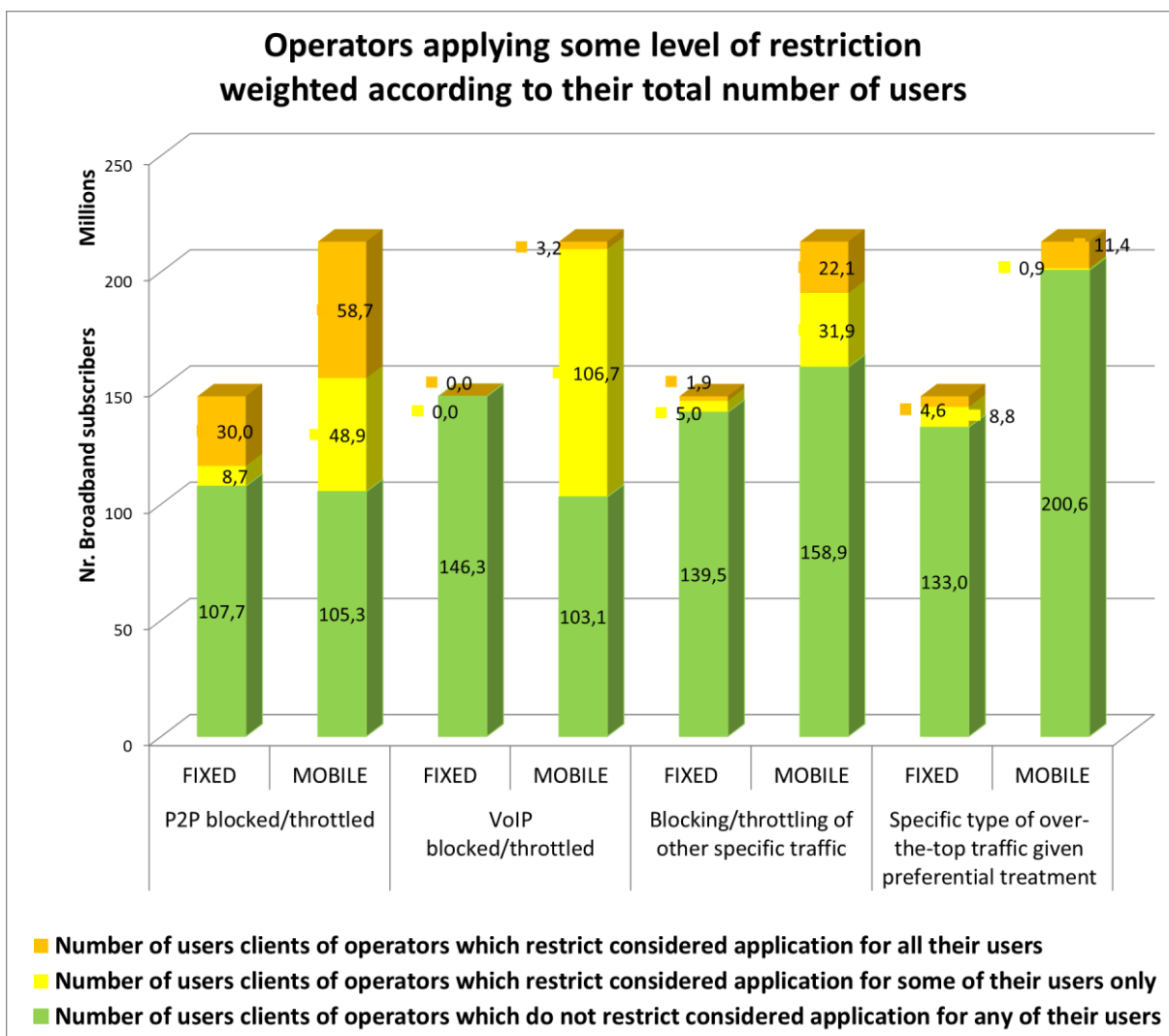


Figure 6 Number of providers which do not, sometimes or always, restrict the use of internet services, weighted according to number of customers

Source: BEREC (2012), A view of traffic management and other practices resulting in restrictions to the open Internet in Europe, BoR (12) 30, Graphic 6.

Figure 2 represents the affected customer numbers. P2P is blocked or restricted for 30 million fixed access internet subscribers (21.4%). P2P is blocked or restricted for an (unknown) number of 8.7 million (6.2 %) fixed access internet subscribers.

In the mobile sector, P2P is blocked or restricted for 58.7 million customers (27.6% of a total of 212.9 million). P2P is blocked or restricted for an (unknown) number of 48.9 million customers (23.0 %).

Figure 2 does not include providers who did not publish their customer figures.

4.2 Legal status in Switzerland

If network operators block, rather than transmit data, or if they prioritise or discriminate against data, then neither consumers nor content providers (particularly media) can require them to lift the block on the basis of the freedom of expression and freedom of information in Article 16 of the Federal Constitution. Freedom of opinion and information protects against state interference. It only protects the actions of private individuals, as the existing right must be interpreted in line with the fundamental right of

freedom of opinion and information (in accordance with Article 35 paragraph 3 of the Federal Constitution). The protection of freedom of expression and information is regularly linked to demands to guarantee network neutrality.

The principle of telecommunications confidentiality in Article 43 of the Telecommunications Act does not protect against inequalities in data transport. Neither is unequal treatment illegal in terms of falsification or suppression of information according to Article 49 of the Telecommunications Act insofar as the network operators themselves contractually stipulate the possibility of different treatment.

Only telecommunications service providers (TSPs) are protected against market dominant TSPs restricting their services via access rights provided for in the Telecommunications Act, in particular the right to interconnection.

According to Article 12a paragraph 2 of the Telecommunications Act the Federal Council can oblige the TSP to publish information on the quality of telecommunication services.

Customers have no rights against interference in relation to network neutrality by their TSP if the TSP formulates its terms and conditions accordingly.¹²

The existing Telecommunications Act does not offer providers of content, services and applications via the internet any options to take action against any impairment of their access to network operators' infrastructure and customers.

The Cartel Act provides protection against abusive behaviour during data transport by market-dominant TSPs and unlawful agreements affecting competition.¹³

The Unfair Competition Act provides both TSPs and providers of services, applications and content some protection against discrimination by non-market-dominant TSPs. However, in practice there are serious difficulties in determining the substantive justification of the conditions of discrimination. Furthermore, no immediate action is generally taken in the event of sales interference.

There are no regulations specific to network neutrality in Switzerland.

4.3 Legal status and developments abroad

4.3.1 EU

In the EU, network operators must inform their customers of the quality of telecommunications services (Article 20 paragraph 1 letter b, Article 21 paragraph 3 letters c and d Universal Service Directive). This also includes whether the access to services or applications is restricted, whether traffic is measured or influenced, and whether customers are forbidden to use certain terminals. If a network

¹² The terms and conditions must comply with the scope of Art. 8 UCA and may therefore not provide for "violations of the principle of good faith which cause a significant and unjustified imbalance between contractual rights and obligations to the detriment of its customers". Such elements of an offence may not generally be present in the case of violations of network neutrality.

¹³ As the example of Comcast in the USA illustrates, it is also conceivable that firms which are not market dominant can introduce practices which lead to unequal treatment of data transport. The FCC, for example, instigated proceedings against the non-market-dominant Comcast Corporation (Procedure 08-183, https://apps.fcc.gov/edocs_public/attachmatch/FCC-08-183A1.pdf). According to the FCC Decision, Background, margin number 6 - 9, Comcast initially expressly denied obstructing certain internet use of its customers (i.e. those using the BitTorrent protocol) using fake data packets. When this obstruction was detected by third parties, Comcast announced that this happens only given serious network congestion. When it was demonstrated that the infringement occurred even during normal network load, Comcast finally admitted to this. Such cases are not known in Switzerland.

operator announces a change of this quality, its customers may terminate their contract without payment of penalties (Article 20 paragraph 2 Universal Service Directive). The network operator must inform its customers of this option to terminate the contract. Regulators may also require network operators to inform the public of the quality of telecommunications services (Article 21 paragraph 3 letters c and d, and Article 22 paragraph 1 Universal Service Directive). Under certain conditions, regulators may also require a minimum quality of internet access from network operators (Article 22 paragraph 3 Universal Service Directive).¹⁴ Regulators should ensure that end users are in the position to retrieve and distribute information or use any applications and services (Article 8 paragraph 4 Framework Directive).

In the EU, the rules which have existed since 2009 are currently being specified and made stricter according to the current state of legislative procedure. In April 2014, the European Parliament adopted comprehensive guidelines on network neutrality at the first reading of the Draft Regulation of the European Commission on the EU Single Market for Telecommunications.¹⁵ If these provisions are confirmed in the Council of Ministers, internet access services may only be offered "in accordance with the principle of 'net neutrality'" (Art. 2, para. 2 no. 14). Within the limits of any contractually agreed data volumes or speeds for internet access services, blocking, restricting, degrading or discriminating against specific content, applications or services, or specific classes thereof, is prohibited. Traffic management measures must be transparent, non-discriminatory, proportionate and appropriate in order to implement a legislative provision or a court order, or prevent or impede serious crimes; preserve the integrity and security of the network, services provided via this network, and the end-users' terminals; minimise the effects of temporary or exceptional network congestion provided that equivalent types of traffic are treated equally (Art. 23, para. 5). Specialised services¹⁶ may only be offered, "if the network capacity is sufficient to provide them in addition to internet access services and they are not to the detriment of the availability or quality of internet access services". In this case, internet access providers may not discriminate between "functionally equivalent services and applications" (Art. 23, para. 2). However, the legislative process is not yet complete.

4.3.2 Individual countries

The Netherlands have gone beyond the EU regulations and prohibited network operators from differential treatment of data during transport. Slovenia, Chile and Brazil also have similar restrictions.

Norway, Denmark, Great Britain, Hungary and Sweden have sectoral agreements on network neutrality.

¹⁴ This is to distinguish from internet access in the context of the universal service in Switzerland. In Switzerland, this task falls to a licensed universal service provider. In the EU, any provider may be required to ensure the minimum quality.

¹⁵ 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)).

¹⁶ Defined as "an electronic communications service or any other service that provides the capability to access specific content, applications or services, or a combination thereof, and whose technical characteristics are controlled from end-to-end or provides the capability to send or receive data to or from a determined number of parties or endpoints; and that is not marketed or widely used as a substitute for internet access service" (Art. 2, para. 2 no. 15).

4.3.3 USA

In the United States, the many attempts to regulate network neutrality through a change in the law have been unsuccessful. In 2005 and 2010 the FCC attempted in vain to adopt network neutrality regulations on the basis of the existing act. In both cases a court found that the legal basis for these regulations was insufficient. In April 2014, the FCC put forward new proposals for "open internet principles" and launched a public consultation. The process is not yet complete.

4.3.4 Foreign examples of forms of behaviour discussed under the heading of "network neutrality"

Forms of behaviour under the heading "network neutrality" subject to heated debate can be roughly divided into five categories:

- Blocking services
- Prioritising services
- Slowing down services
- Product differentiation for internet access
- Other

To illustrate the controversial forms of behaviour discussed in the press and on the internet, the following contains an example for each category. The question of whether each of the listed examples actually constitutes a violation of network neutrality remains open. There is also a more comprehensive list of foreign examples from the network neutrality debate in the annex.

An oft-cited example of *Blocking services* is the Madison River case. Madison River is an internet access provider in North Carolina, USA which blocked VoIP services in 2004/2005. Madison River lifted this block after pressure from the FCC.¹⁷

The category of *Prioritising services* includes a discussion regarding the behaviour of the US DSL provider Windstream Communications. In April 2010 it redirected its customers to Windstream's own search engine when they typed a search string into the Firefox toolbar in the Firefox browser.¹⁸

An example of *Slowing down services* is the discussion regarding Netflix and Verizon. According to unconfirmed measurements by a concerned engineer, Verizon secretly impeded Netflix in February 2014. Since Netflix is hosted on Amazon Cloud Services, Verizon apparently impeded all traffic from Amazon Cloud Services (including traffic from sources other than Netflix).¹⁹

The Drosselkom discussion in Germany is one of the forms of behaviour in the category *Product differentiation for internet access*. For a certain time Deutsche Telekom's data caps did not apply to its own internet television service Entertain or internet telephony.²⁰

Other covers a wide range of cases. It includes, for example, the case in which the EU Commission searched the offices of Deutsche Telekom, Orange SA and Telefónica on 9 July 2013, because Co-

¹⁷ http://news.cnet.com/Telco-agrees-to-stop-blocking-VoIP-calls/2100-7352_3-5598633.html

¹⁸ <http://www.savetheinternet.com/blog/10/04/05/phone-company-helps-make-case-net-neutrality>

¹⁹ <http://davesblog.com/blog/2014/02/05/verizon-using-recent-net-neutrality-victory-to-wage-war-against-netflix/>

²⁰ <http://www.handelsblatt.com/unternehmen/it-medien/neue-dsl-tarife-spd-pocht-auf-netzneutralitaet/8109582-3.html>

gent had accused these network operators of deliberately ensuring the capacity of the connections between Cogent's network and their own networks was insufficient. In October 2014, it reported that it was discontinuing the investigation of internet interconnection services, but would monitor the sector.²¹

4.4 Market development in Switzerland

In Switzerland there are also controversial services; these are discussed under the heading "network neutrality" and are as follows:

- Mobile subscriptions for smaller target groups as part of which the use of VoIP services (e.g. Skype) is excluded (so that the user uses the mobile radio service provider's voice telephony services for his or her telephone calls rather than VoIP services via a mobile internet connection).

Arguments of the opponents of network neutrality regulation	Arguments of the proponents of network neutrality regulation
<p>Such services are usually priced lower than those without such restrictions.</p> <p>There are also unlimited additional services (from the same and other providers). This is the basis on which customers make their decision.</p> <p>Specifically, such services (e.g. sunrise24) came into being after the introduction of Infinity products by Swisscom and are an attempt by the competition to compete.</p> <p>A network neutrality regulation would make such service rates impossible and would limit product design opportunities, thus weakening competition and innovation.</p>	<p>Such services can be referred to as false advertising. Products are sold as internet access although they do not comprise complete internet access at all. The customer must pay more to gain neutral network access.</p> <p>The ISPs discriminate primarily in favour of services which they offer. There is no reason why the cost of a contract should decrease significantly when the use of internet voice transmission services are excluded from the service. Such services require only a small volume of data and have no significant impact on network congestion.</p>

- Internet access points which place a cap on the amount of traffic, but exempt some services (e.g. Spotify, TV, WhatsApp) from this cap.

Arguments of the opponents of network neutrality regulation	Arguments of the proponents of network neutrality regulation
<p>Such services are more expensive than those without these inclusive services. The customer therefore makes a conscious choice and pays for the additional services.</p> <p>Any competitor of Spotify, WhatsApp or Zattoo can apply to be accepted as inclusive services within the range of services offered by a fixed or mobile operator, i.e. there is a level playing field.</p> <p>A network neutrality regulation would make such services impossible and would limit product design opportunities, thus weakening competition and innovation.</p>	<p>Such services cause considerable disruption to the level playing field between CAPs. Competing companies are prevented from competing. There is discrimination from a commercial point of view.</p> <p>The main problem with "out-of-cap delivery" is that ISPs choose which CAPs can offer their customers this "free data". If ISPs do not already give preference to their own services, they are unlikely to take into consideration innovative start-ups. Instead they conclude contracts with</p>

²¹ <http://www.reuters.com/article/2013/07/11/eu-telecoms-idUSL6N0FH1OL20130711> and http://europa.eu/rapid/press-release_IP-14-1089_de.htm

	those companies which have already established themselves on the market. Small competitors are left standing and the market is consolidated. This leads to a weakening of competition and innovation.
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- The restriction of internet access when services with high bandwidth requirements (e.g. television) offered by the network provider are consumed (as described in Section 3.2.2) on the same line.

Arguments of the opponents of network neutrality regulation	Arguments of the proponents of network neutrality regulation
<p>Prioritisation of managed services such as Swisscom TV occurs only when the capacity of the access line is not sufficient to handle all internet traffic. In such a case this measure <i>must</i> be possible, otherwise it is impossible to provide the quality guaranteed to the customer and for which he has paid.</p> <p>Instead of specialised services, such as Swisscom TV, customers could easily choose internet services such as Zattoo, Wilmaa or Teleboy, which are free in standard quality. In this case, the customer therefore makes a conscious choice and indicates that specialised services meet a need.</p> <p>A network neutrality regulation, which would make such services impossible, would thereby limit product design opportunities, thus weakening competition and innovation.</p>	<p>Customers pay not only for specialised services, but also for access to the open internet. In the case of bandwidth specification for internet access, they assume that this bandwidth is always available, but this is not the case for split lines.</p> <p>Managed services can also be abused and used as a basis for a two-tier internet. They offer ISPs the opportunity to favour their own internet-based services and content, or those of commercial partners. They thus create the condition that allows ISPs to require money from CAPs for prioritising their content and applications. However, only large, established CAPs can afford this. In the medium to long term this reduces the innovation potential of the internet and restricts consumers' freedom of choice.</p>

The limitation of internet access for users who always use the full access capacity sold ("fair use policies") is also widespread in Switzerland. However, it is often not considered part of the network neutrality debate. This may simply be a temporary phenomenon whose significance could be reduced by future price structures for internet access.

5 Approaches under discussion

In the global debate on network neutrality, many different action strategies have been proposed. These extend from the call for non-interference by the state in technical and economic processes to the call for legislation to prevent certain practices. Under the currently unregulated situation in Switzerland it will be interesting to see whether the approaches put forward to adapt to this situation attract attention. This report cannot make this assessment, but wishes to contribute to the creation of the necessary basis for discussion. Commonly voiced action strategies for the regulation of network neutrality are listed below. The attitudes of proponents and opponents are then compared.

It is generally agreed that data whose transport breaches laws or jurisdiction or which impairs the security of data networks and terminals must not be transmitted in an open internet.

Some advocate that the Confederation should measure the quality of internet access and create transparency. In contrast, there is an argument that there are already ways of measuring quality and such work should only be started given an appropriate cost-benefit ratio.

Some consider the multi-stakeholder dialogue as an effective means to ensure the development of the internet. Furthermore, the multi-stakeholder dialogue is also raised in relation to the development of internet governance.

Approaches from the current EU legal framework:

- Duty to provide information on differentiation (as in Articles 20, 21, 22 of the Universal Service Directive),
- Right to withdraw for customers if the network operator informs them of a modification in the rules for differentiation (as in Article 20 paragraph 2 of the Universal Service Directive),
- Any minimum quality for internet access stipulated by national regulatory authorities (as in Article 22, paragraph 3 of the Universal Service Directive),
- Abstract net freedoms (customers can use the services, applications, content and devices of their choice, as defined in Article 8, paragraph 4 letter g of the Framework Directive).

Other approaches put forward for network neutrality regulation:

- Prohibition of the blocking of data or intentionally poor quality data transport on the internet,
- Obligation to present details of differentiation in transport to an authority for advance approval,
- Different degrees of approval of differentiation: This includes prohibition of differentiation, except when there are objective reasons, whereby it should be clarified who decides on the existence of an objective reason. Furthermore, provisions are mentioned which allow differentiation between different applications, services or content (e.g. between video and e-mail) or, if this is desired by end users in a specific case,
- Stipulation of network neutrality as a principle with subsequent rulings on exceptions (defence against attacks on the integrity of the networks, compliance with government regulations, temporary data congestion),
- Restriction of the term "internet" to services which offer non-discriminatory access to the entire internet,
- Obligation for all network operators with sufficient capacity to providers of "transit" (i.e. a connection to the entire internet for network operators) to be connected (so that network operators are available to all other network operators - if not already via peering, then at least through this transit provider),
- Separation of network infrastructure providers and content providers.

Approaches of the opponents of network neutrality regulation	Approaches of the proponents of network neutrality regulation
<p>The pre-emptive legal regulation of network neutrality is rejected.</p> <p>First, there are no violations of network neutrality in Switzerland. Furthermore, none of the listed and verifiable Swiss or foreign examples provided by the proponents still exist.</p> <p>Second, the rules which the proponents of network neutrality regulation have in mind restrict the range of products and consumer choice; this would also have a detrimental effect on competition. The opportunity to offer new products and</p>	<p>Without regulation there is a risk that network neutrality in Switzerland could, as has already been regularly observed abroad, be more seriously violated than it is today. This would have disadvantages for what has until now been a very successful Swiss start-up scene and would restrict the freedom of choice of consumers on the internet. As pointed out in this report, there are already examples which prove that a decision for certain content and services must be made at the same time as the decision for an internet provider. The danger is that this will become the rule. The result will be that the variety</p>

product bundles alone or together with other companies forms part of economic innovation. There is no reason why network operators should have to limit themselves to technological innovation.

Third, network providers which block or otherwise discriminate against certain services and applications desired by consumers are disciplined by the market, because customers will switch to mobile networks which do not implement such blocks. Competition governs the behaviour of market participants.

Fourth, there is no incentive to block or otherwise discriminate against innovative services and applications as customers want such services and applications. Network operators who block or discriminate would also be punishing themselves.

Fifth, transparency and openness are strong tools for regulating inference with traffic which affects competition or prevents innovation. Should additional information be required, the Federal Council could pass by Ordinance appropriate provisions based on Art. 12 para. 2 TCA.

The development of the internet to date has taken place without regulatory intervention. This approach should be maintained, since there are no grounds for intervention and the lack of regulation has probably made a significant contribution to the success of the internet.

of products advertised by ISPs will restrict diversity. It will no longer be consumers who decide what content and applications they want to use, but internet access providers.

Although the development of the internet to date, which was free of intervention, has been a success story, this is exactly the model which the opponents of regulation want to forego. Internet access providers want the maximum possible freedom to be able to interfere with internet traffic. New examples from abroad, but also the Swiss examples listed in this report, illustrate the evident interest of internet access providers in establishing new business models at the expense of network neutrality.

For some time there have been subscriptions which, for example, exempt music or IPTV services of their own companies or commercial partners from their data cap. Furthermore, Netflix claims it has also concluded contracts for improved transport with ISPs in Switzerland.

With their own services and content, ISPs in Switzerland and abroad are in competition with CAPs in the same network. ISPs therefore have the economic incentive to promote their own services wherever possible, even if it is only by competing services having to pay more for guaranteed quality.

ISPs cannot therefore compare their new business models to CDN services and claim that CDNs are selling CAPs transmission quality which is already guaranteed today. In contrast to ISPs, CDNs are pure service providers and have no incentive for discrimination when selling their transport services. Furthermore, CDNs do not sell any transport to end customers. They provide improved transport between networks. However, CDNs do not guarantee improved transport within the networks of the ISP. Neither does a CDN service protect CAPs against discrimination in the end customer network.

The same applies to networks constructed by CAPs. These are also not end customer networks. If, however, such content providers actually mutate into ISPs in future, they would also have to ensure network-neutral transport to the end customer.

When it comes to justifying the call for additional revenue for CAPs, the network operators are

	<p>wont to reference the revenue of major CAPs such as Google, Facebook and Amazon. This reference to internet giants blurs the discussion. These few international service providers are not representative of the diverse CAP market, let alone of Swiss CAPs. However, the impact of new business models, e.g. "passing lanes" to the end customer would affect all CAPs, even small ones, because they too would have to offer their content and services to end customers in competitive quality. They are therefore effectively forced to conform - or be left standing. Apart from any economic basis, there is no call from network operators for a percentage of revenues of major CAPs because the network operators are not in any way involved in the investments and risks of CAPs.</p> <p>Given the evident economic interest of ISPs (illustrated by numerous examples) network neutrality regulation would be anything but too early. Indeed, any delay in regulation is in the interest of ISPs. In the meantime, they have the opportunity to establish new business models step by step. Once these and failures in data transport via the internet are established, it will be almost impossible to reverse them.</p>
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As has already been outlined, it is not the subject of this report to evaluate the approaches discussed by the proponents of a statutory provision or the arguments for or against legal regulation. This will be the task of political discourse.

Annex 1: List of participants

First name	Surname	Company
Christian	Grasser	asut
René	Dönni Kuoni	OFCOM
Jens	Kaessner	OFCOM
Sarah	Lüthi	OFCOM
Thomas	Schneider	OFCOM
Lukas	Steffen	OFCOM
Lorenz	Schori	Digitale Gesellschaft
Andreas	Von Gunten	Digitale Gesellschaft
Peter	Bär	Swiss Federal Communications Commission
Andreas	Kaelin	ICTswitzerland
Balthasar	Glättli	ISOC Schweiz
Bernie	Hoeneisen	ISOC Schweiz
Marcel	Huber	Orange Communications SA
Felix	Weber	Orange Communications SA
Simon	Schlauri	Ronzani Schlauri Anwälte
Alicia	Portenier	SKS
Sara	Stalder	SKS
Thomas	Saner	SRG SSR
Michael	Schweizer	SRG SSR
Olivier	Buchs	Sunrise Communications AG
Matthias	Stürmer	Swiss Open Systems User Group
Stefan	Flück	Swisscable
Matthias	Lüscher	Swisscable
Adrian	Raass	Swisscom (Schweiz) AG
Rastislav	Slosiar	Swisscom (Schweiz) AG

Network neutrality

Christoph	Graf	Switch
Karim	Zekri	Teleboy
Jürg	Aschwanden	upc cablecom GmbH
Michael	Widmer	upc cablecom GmbH

Annex 2: Foreign examples; discussed under the heading network neutrality

Blocking services

Madison River, an internet access provider in North Carolina, blocked VoIP services in 2004/2005. Madison River lifted this block after pressure from the FCC.²²

TELUS, one of the largest ISPs in Canada, blocked its customers' access to a website on which a trade union reported its dispute with TELUS.²³

British ISPs (BT, Tiscali, Carphone Warehouse) demanded increased transfer fees from the BBC and threatened otherwise to "pull the plug" on its internet TV service iPlayer, which has offered streaming and downloads since the end of 2007.²⁴

Comcast, the second largest ISP in the United States, prevented certain services, e.g. BitTorrent P2P-filesharing²⁵, until it was banned from doing so by the FCC. This approach was also used by another ISP. The FCC ban was lifted by a court of appeal on 7 April 2010.

VoIP blocking has occurred on mobile networks in Austria, Germany, Italy, Portugal, the Netherlands, Croatia, Romania and Switzerland.²⁶

Internet traffic has been impeded or blocked (e.g. certain internet sites, peer-to-peer traffic, video streaming, or the entire connection to the customer) in France, Greece, Lithuania, Poland and the UK.²⁷

In 2012, Korea Telecom refused to allow access to the internet for Samsung TV devices used by Korea Telecom internet access customers.²⁸

²² http://news.cnet.com/Telco-agrees-to-stop-blocking-VoIP-calls/2100-7352_3-5598633.html

²³ This example is not first and foremost about economic factors, but democratic rights.

²⁴ <http://www.ft.com/cms/s/0/f3428cd4-48fb-11dc-b326-0000779fd2ac.html#axzz34n9clpM8>

²⁵ According to tests by AP and the Electronic Frontier Foundation methods used included inserting forged TCP/IP resets. The computers on the network endpoints therefore assume that invalid data packets are being sent and stop the data transfer. cf. <http://www.heise.de/newsticker/US-Kabelnetzbetreiber-Comcast-bremst-Peer-2-Peer-aus--/meldung/97687>

²⁶ According to the IRG/BEREC Project Team net neutrality 2010 survey.

²⁷ According to the IRG/BEREC Project Team net neutrality 2010 survey.

²⁸ http://www.circleid.com/posts/20140426_rip_network_neutrality/

Prioritising services

In April 2010 the US DSL provider Windstream Communications redirected its customers to Windstreams' own search engine when they typed a search string into the Firefox toolbar in the Firefox browser.²⁹

AT&T offers a scheme whereby customers of other ISPs pay for data transport to AT&T customers ("sponsored data").³⁰

Slowing down services

In 2005, several ISPs and cable network operators in the USA attempted to slow down Vonage's VoIP services or exclude them from their networks.

Rogers Communications, Canada, and Bell Canada both reduced the performance of certain applications such as BitTorrent.³¹

In summer 2009, upc slowed down peer-to-peer traffic for Netherlands-based customers of the product Fiber Power Internet to one-third of the contracted capacity between noon and midnight. This was ended immediately after these tests became known.³²

In 2007 internet access provider Neuf impeded access to the popular French website dailymotion.fr for its customers (about one third of all French broadband customers) by 90% so that viewing videos became impossible.³³

February 2014: According to unconfirmed measurements by an engineer involved, Verizon secretly impeded Netflix. Since Netflix is hosted on Amazon Cloud Services, Verizon apparently impeded all traffic from Amazon Cloud Services (including those not via Netflix).³⁴

Product differentiation for internet access

Shaw Communications, Canada, demanded a CAN\$ 10.00 supplement for internet customers who wanted to use VoIP.³⁵

Deutsche Telekom data caps did not apply to its own internet television service *Entertain* or internet telephony.³⁶

Special cases

²⁹ <http://www.savetheinternet.com/blog/10/04/05/phone-company-helps-make-case-net-neutrality>

³⁰ http://www.theregister.co.uk/2014/01/06/att_to_let_providers_pay_for_broadband/

³¹ <http://www.golem.de/0908/68752.html>

³² *Tagesanzeiger* of 30.09.2009, "Holländer sorgen für ungebremstes Internetvergnügen in der Schweiz".

³³ <http://blog.dailymotion.com/fr/index.php/2007/08/11/probleme-reseau-neuf-cegetel/>

³⁴ <http://davesblog.com/blog/2014/02/05/verizon-using-recent-net-neutrality-victory-to-wage-war-against-netflix/>

³⁵ http://www.parl.gc.ca/40/2/parlbus/commbus/senate/Com-e/tran-e/47244-e.htm?Language=E&Parl=40&Ses=2&comm_id=19, Prof. Michael Geist

³⁶ <http://www.handelsblatt.com/unternehmen/it-medien/neue-dsl-tarife-spd-pocht-auf-netzneutralitaet/8109582-3.html>

AT&T removed statements critical of the government by an American music group from a webcast on a webcast platform it operated.³⁷

According to Apple's conditions for developers of applications for the iPhone, the development of VoIP applications which use mobile phone networks was not permitted until January 2010.³⁸

The FCC investigated the dispute between Apple and Google on Apple's alleged blocking of the Google Voice iPhone application.³⁹

The Skype app for the iPhone allowed the use of Skype for phone calls (including those using an iPhone) until 2010, but only over a WiFi connection, not via UMTS.⁴⁰ Apple had contractually guaranteed this with AT&T, so that AT&T would not suffer losses as a result of mobile voice telephony by AT&T customers using Skype via iPhone. AT&T disclosed this to the FCC.⁴¹

The French internet service provider Free.fr offered users of its router/modem combination (known as Free-box) the opportunity, using firmware updates, to block advertisements in the router rather than in the browser.⁴²

In the case of Free/Google, ARCEP initiated a formal investigation after it was revealed that end customers of the ISP "Free" were receiving Google content (esp. YouTube) in poor quality. It emerged that the problem was twofold: the route selection via international transit providers, which was more cost-effective for Google on the one hand, and overloaded connections between Free and these international transit providers on the other. Furthermore, the direct peering capacity between Free and Google was insufficient. Free suggested that its customers use its own free video service Dailymotion instead of YouTube.

³⁷ This example is not first and foremost about economic factors, but democratic rights.

³⁸ <http://TechCrunch.com/2010/01/28/why-carriers-didnt-want-to-allow-3G-VoIP-before-and-why-theyre-now-setting-it-free/> cf. also the opinion of AT&T on the FCC:

"In particular, both parties required insurance that the revenues from the AT&T voice plan available to customers would not be reduced by enabling VoIP calling functionality on the iPhone. Thus, AT&T and Apple agreed that Apple would not take affirmative steps to enable an iPhone to use AT&T's wireless service to make VoIP calls.", AT&T Response to Wireless Telecommunications Bureau Letter, DA 09-1737 (31 July 2009); RM-11361; RM-11497.

³⁹ <http://www.heise.de/newsticker/US-Telekomaufsicht-ermittelt-nach-Sperrung-von-Google-Voice--/meldung/142922>

⁴⁰ <http://www.wired.com/2010/02/iphone-skype-over-3g-real-soon-now/>

⁴¹ "In particular, both parties required insurance that the revenues from the AT&T voice plan available to customers would not be reduced by enabling VoIP calling functionality on the iPhone. Thus, AT&T and Apple agreed that Apple would not take affirmative steps to enable an iPhone to use AT&T's wireless service to make VoIP calls.", AT&T Response to Wireless Telecommunications Bureau Letter, DA 09-1737 (31 July 2009); RM-11361; RM-11497.

⁴² <http://www.heise.de/newsticker/meldung/Franzoesischer-Provider-blockiert-Werbung-im-Router-1777463.html>

On 9 July 2013 the EU Commission searched the offices of Deutsche Telekom, Orange SA and Telefónica, because Cogent had accused them of deliberately ensuring the capacity of the connections between Cogent's network and their own networks was insufficient.⁴³ In October 2014, it reported that it was discontinuing the investigation of internet interconnection services, but would monitor the sector.⁴⁴

In March 2014, Level3 asked the FCC to oblige ISPs to connect their networks to other networks on commercially reasonable terms. According to this requirement, ISPs may require payment for transport services, but not for access to end customers who control them.⁴⁵

⁴³ <http://www.reuters.com/article/2013/07/11/eu-telecoms-idUSL6N0FH1OL20130711>

⁴⁴ http://europa.eu/rapid/press-release_IP-14-1089_de.htm

⁴⁵ http://www.level3.com/~media/Assets/legal/l3_openinternet_march2014.pdf

Annex 3: Opinions of some participants in the working group

asut

Digitale Gesellschaft

Orange, Sunrise, Swisscable, Swisscom and upc cablecom

Simon Schlauri

SKS

SRG

switch



Schweizerischer Verband der Telekommunikation
Association Suisse des Télécommunications
Swiss Telecommunications Association

Opinion on the report of the network neutrality working group

In recent decades telecommunications networks have become an increasingly important basic infrastructure for the economy and society. Data traffic and services on these networks increasingly rely on the internet protocol (IP). The result of the convergence of telecommunications and the internet is that governance principles from the internet are also being transferred to telecommunications. This is how the best-effort principle for all IP-based services and data communications is to be applied as part of network neutrality regulation. However, this can have serious consequences.

Until now, telecommunications services and the associated infrastructures have been closely linked. Increasing traffic on a DSL connection was, for example, unable to interfere with analogue telephony. In Switzerland - but also all over the world - telecommunications networks are in the process of being converted to all-IP. The internet protocol is therefore becoming the global standard for data transmission and communication. All services operate using the same connections and protocols and a strict best-effort principle can cause demanding services such as telephony, video conferencing, social gaming and real-time streaming to be compromised in terms of quality and to be discriminated against.

Some proposals to regulate network neutrality therefore provide for exceptions under the slogans "technically necessary network management" or "specialised services". However, this ignores the fact that even if it provides exemptions, legal regulation is unlikely to be in a position to keep pace with the technological developments in information and communication technology for the foreseeable future. There are also problems in terms of implementation: Who decides what network interference is allowed and on what basis? Who determines what quality losses are acceptable and how are complaints and complaint procedures to keep pace with a technology which measures innovation cycles in months? Network neutrality regulations enshrined in law therefore run the risk of inhibiting innovation and delaying essential investment in the network infrastructure.

Nevertheless, the network neutrality debate is important. Open access to the internet and functioning competition, which allows new stakeholders simple and global access to customers, is essential for the innovation and the development of new services. The focus, however, is on the factors of market access and functioning competition. The best-effort principle on the other hand is the result of a technical perspective which is not appropriate for market analysis.

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In other words, whether competition works and whether new services come onto the market quickly and easily is not necessarily related to how individual data packets are handled.

On the other hand, the instruments and models of industrial economics cannot simply be applied directly to the internet (see the statement by Jean-Charles Rochet in the *Tagesanzeiger* of 14 October 2014), which is why viewing the situation exclusively from the perspective of competition law is not sufficient to adequately and quickly assess market distortions in the internet. There is, for example, still no consolidated view on two-sided markets (e.g. Google) or market boundaries. Is WhatsApp now a competitor to SMS and telephony because young people now mainly chat and rarely make calls?

The Swiss telecommunications association asut is committed to fair, free and dynamic competition in telecommunications. Rigid (compared to the dynamics of the internet) legal regulation of network neutrality will hamper innovation and not promote competition. There is, however, no need to reinvent the wheel: the internet community has already developed successful tools and illustrated how viable internet governance can be ensured despite diverse interests and technical development with the multi-stakeholder approach.

Instead of a legal regulation, the asut therefore proposes pursuing a multi-stakeholder approach under the leadership of a recognised institution, e.g. ComCom, which combines expert knowledge of both the market and the technology. Such a body would be able to quickly recognise and, if necessary, make public the threat of discrimination, thereby exerting pressure on market participants. It would also be possible to develop pragmatic and practical self-regulation of the sector.

In view of rapid technological development and the dynamic markets, the multi-stakeholder approach and self-regulation are adequate instruments to ensure an open internet and intense competition.

Opinion of Digitale Gesellschaft Schweiz (Swiss Digital Society) on the report of the OFCOM network neutrality working group “Network neutrality”

The Digitale Gesellschaft Schweiz is in favour of enshrining a guarantee of network neutrality in law.

Every person has the freedom to offer content and services on the internet, as long as these do not violate applicable law. This important principle may be lost if network neutrality is not enshrined in law. Various stakeholders are calling for a two-tier internet, which allows unrestricted access to users only to a few financially strong content providers; this process is already underway.

It is therefore necessary to make the three key principles of network neutrality applicable under law:

1. **"End-to-end" principle:** The principle that all connected devices can communicate freely with each other.
2. **"Best-effort" principle:** The principle that each network operator makes its best effort so that data can flow as efficiently as possible.
3. **"Innovation-without-permission" principle:** The principle that anyone can develop the internet and offer his or her own new services and content without having to ask permission from the network operator or anyone else.

Enshrining network neutrality in law is an important basis for maintaining and further developing Switzerland as an innovative research and industrial base. It is also essential for ensuring both cultural diversity and Swiss identity on the internet.

If network neutrality is not ensured, network infrastructure operators will take control of content. They will demand higher tariffs from some providers of content and users for certain content. This is problematic, firstly because many large network operators themselves act as content providers on the market and are thus in a position to discriminate in favour their own services. Second, it is socially undesirable, because it promotes the formation of oligopolies in the information technology and communications industry, which would lead to Switzerland losing competitiveness and innovation potential in the key industries of the future.

Although it is true that the use of the internet infrastructure is continuously increasing and will continue to increase, the costs of expansion and operation of this infrastructure can (in compliance with network neutrality, i.e. regardless of the type and content of the data transported) continue to be charged using end user connections. Infrastructure costs should not be subsidised by fee-based content services. The enshrinement of network neutrality in law is one of the prerequisites for a culturally diverse, innovative, competitive and equitable Switzerland.

All three major providers (Swisscom, Orange and Sunrise) already violate net neutrality by giving preferential treatment to certain internet services (e.g. the TV service Zattoo and the music service Spotify) over other services. The prioritisation of certain internet data makes it possible for network operators to continue to further complicate the comparability of internet access services and to limit the

already weak competitive nature of the Swiss telecommunications sector. Swisscom, for example, no longer offers any "pure" internet access; it is only available in combination with its Swisscom TV and telephony services.

Contrary to the statements of operators, prioritisation is used not to overcome capacity bottlenecks, but mainly to demand money for a "passing lane" on the internet from providers of content and services; this discriminates against small and new providers and diminishes their innovation potential (two-tier internet). Of course, exceptions can be made in those rare cases in which prioritisation is useful (e.g. emergency services).

Competition does not guarantee network neutrality. This is confirmed by numerous examples in Switzerland and abroad which show that violations of network neutrality are part of everyday life. The vehement efforts of the major network operators in Switzerland to combat the legal enshrinement of network neutrality, often using the argument that innovative telecommunications services would no longer be possible, indicates that violations of network neutrality are already planned to gain competitive advantage.

Competition is open to Swiss network operators, even if there were statutory regulation of network neutrality. They can continue to offer internet access and their own services (e.g. internet telephony and television). However, preferential treatment of such services over third-party services would no longer be likely in the case of transmission, simply because the operators control the connection to the end customer. This would mean that users and not the provider would continue to determine the success or failure of internet services. Network neutrality does not prevent competition; it encourages it and strengthens the innovation potential of Switzerland.

6 October 2014

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Network neutrality: Joint statement of Orange, Sunrise, Swisscable, Swisscom and upc cablecom on the report of the working party

The internet has developed without a regulatory framework

The internet has developed into its current form over the course of approximately 20 years. Initially conceived as a network for scientists, in just two decades it has become the modern, global network of networks. Technical and commercial innovations have allowed the internet to master every challenge quickly, economically and without regulatory frameworks. The internet has contributed to the promotion of the freedom of expression, freedom of information and freedom of the press as well as to new business models and the success of global companies.

Internet access providers have invested billions in network construction in the context of economic freedom, thereby taking on significant investment risk. Any government intervention would therefore require very good cause.

The internet is and remains open

We stand for an open internet. The internet is and should remain open for all, especially for new business models, new technologies and new products. It should be possible for anyone to publish information and content, exchange opinions and to attempt new ventures or continue proven services in the competition for customers. It is in this way that the internet can maintain and enhance its innovative role and its function as an important networking infrastructure.

In their customer agreements, internet users are therefore entitled to an internet connection which allows them to send content of their choice and to obtain and use services and applications of their choice, in compliance with the law.

We have no motivation to block internet services, applications or content (it is precisely the openness of the internet which makes it attractive and successful) and therefore do not restrict the freedom of expression, freedom of information or freedom of the media.

Network management measures which are required by law or judicial order, measures which meet customer needs and promote innovation, and measures which protect and assure the quality of networks must, however, remain possible. These include traffic management techniques which aim to block activities which harm the network, ensuring compliance with rulings from authorities, ensuring the service quality of applications which require this, e.g. prioritisation of real-time services and vital services (e.g. emergency calls), tackling specific temporary network congestion situations and prioritising traffic on an individual user's connection if the user so desires.

These principles are proven and are important for the satisfactory functioning of networks. In terms of the countless business dealings worldwide, actual violations of network neutrality are very rare and in our opinion non-existent in Switzerland. The demands for enshrining network neutrality in law and for regulating it are therefore unjustified. Furthermore, as the following demonstrates, regulation of network neutrality, as its proponents imagine it, would lead to a reduction of product diversity and product innovation.

Regulatory intervention would jeopardise product diversity and product innovation

Proponents of regulation claim that individual products such as Zattoo and Spotify in the case of Orange or Swisscom TV air violate network neutrality because the data consumption of these services is not calculated as part of any data cap. They therefore claim that other music streaming and internet TV services such as Wilmaa and Teleboy are discriminated against. These claims are untrue. This is because unlike Wilmaa or Teleboy, customers pay Zattoo, Spotify and Swisscom TV air for these services and data caps either directly (by subscribing) or indirectly (by agreeing to a higher-value bundle of services).

There are also products from the same provider without inclusive or free services, such as Swisscom TV air easy, which calculate data consumption based on the data volume and display advertising. Similarly, the mobile phone subscription sunrise24 has certain restrictions, but is cheaper than other Sunrise mobile phone subscriptions.

It is also suggested that Sunrise and Swisscom TV products violate network neutrality because internet access is impeded during the use of these services. Such prioritisation occurs only in the rare cases in which the capacity of the connection line is insufficient. This measure must be possible, because otherwise the quality which is guaranteed to customers, and demanded and paid for by them, cannot be guaranteed. Furthermore, customers are free to choose internet TV services such as Zattoo, Wilmaa or Teleboy, which are free in standard quality.

All services mentioned are described transparently and in these cases customers deliberately choose a product which is tailored to them. What all of these products have in common is that they were the result of competition for customers and are thus an attempt to compete. They exist because they meet customer needs. The desire to ban such products as a violation of a misunderstanding of network neutrality is to limit the options for product design and product diversity. This would also make many innovations impossible and reduce competition. The existing network and service competition guarantees an open internet. It is necessary to promote and protect it. Providers which block or impede content, services or applications will lose customers to their competitors and therefore quickly alter their behaviour.¹

Competition will continue to provide an open internet

It is therefore regrettable that the report on network neutrality does not tackle the question of whether market forces alone can ensure an open internet, which, as demonstrated, is to be expected. European regulators, for example, also regard the level of competition as a key element in the assessment of network management measures.² In Switzerland the assessment of the consequences of regulation, which is required when introducing or revising legislation³ requires statements on the need for government action and therefore on the question of whether the market is actually failing in a specific case⁴.

Switzerland is in a good situation in terms of telecommunications technology. According to the OECD it has the highest high-speed broadband penetration rate⁵ and according to Akamai, the highest average connection speeds⁶ in Europe. Over 80% of the population can choose from several access networks and various providers

¹ Claims that non-market-dominant companies could introduce practices which might lead to unequal treatment in terms of data transport, are at the very least misleading. Those who have the technical skills can differentiate between various data streams without market power, i.e. they can treat them unequally. This, however, is not the relevant question. The decisive issue is whether such practices will prevail in the market and in competition in the long term or whether they will be eliminated by competition because they are inefficient and not desired by users, who will move to providers who do not implement such practices. State intervention should only be considered if competition is limited to such an extent that market forces are not automatically able to eliminate unwanted practices (i.e. the market has failed).

² cf. BEREC, Differentiation practices and related competition issues in the scope of net neutrality. 26 November 2012, e.g. margin number 349, but also in many other places.

³ cf. <http://www.seco.admin.ch/themen/00374/00459/00465/04052/index.html?lang=de>

⁴ This omission has since led to misleading statements in the report, such as those stating that the "must-carry" obligations in the broadcasting sector generally follow similar objectives to network neutrality. While the "must-carry" obligations were introduced to implement the performance mandate for radio and television (at the time of the introduction in 1987 broadcasting capacities on the distribution vectors were much lower than today and the wired retransmitters [at that time only the cable networks] had a *de facto* monopoly [cf. the Message on the Federal Act on Radio and Television of 28 September 1987, p. 742 ff. [BBl 1987 III 689]] because market forces would not automatically provide for the retransmission of programmes deemed socially valuable, there was no investigation in the report on network neutrality into the question of whether the market had actually failed and whether state intervention was therefore justified. On closer observation, "must-carry" obligations and network neutrality are contradictory. The above claim, which was made in the same context, according to which network neutrality protects equality of opportunity with regard to the technical availability of the audience, is a misnomer. If prioritisation of time-sensitive services is not possible in the case of capacity bottlenecks, applications such as VoIP and live TV are no longer possible. This means that the call for equal treatment of all data packets does not lead to neutrality of the transport networks for all broadband applications; instead it is linked to discrimination with regards to delay-sensitive applications.

⁵ cf. OECD Broadband Portal, Fixed and wireless broadband subscriptions per 100 inhabitants, December 2013 (<http://www.oecd.org/sti/broadband/1d-OECD-WiredWirelessBB-2013-12.xls>)

⁶ cf. Akamai, Technischer Status des Internet, Q2 2014 (<http://www.akamai.de/dl/akamai/akamai-soti-q214-infographic.pdf>).

The success story of the internet was written in an environment free of government intervention in the market. Competition between infrastructures (networks), operating systems (Android, iOS, Microsoft, Linux, etc.), device manufacturers (Samsung, HP, Acer, Dell, Apple, etc.), service and content providers (Google, Yahoo, Microsoft, Facebook, Amazon, etc.), and many others has made the internet what it is today. This competition - and not government intervention – will continue to ensure that the internet remains open to all and thus remains a place for new business models, new technologies and new products.

Opinion on the report of the network neutrality working group

Dr. Simon Schläuri, Lawyer, Lecturer at the University of Zurich

What is network neutrality?

In a strict sense, network neutrality means that *all traffic on the internet is treated the same*. Specifically it means that internet access providers ("providers") act "neutrally" in relation to various internet services (in the following, "internet services" refer to both applications [e.g. Skype] and content [e.g. websites]).

How and why is network neutrality violated?

There are three basic situations in which network neutrality is violated:

1. In the case of **influencing markets for internet services out of self-interest** a provider prevents its customers from using certain internet services offered by other providers to gain market advantages for its own services. For example, a Dutch mobile telephony operator blocked the short message service WhatsApp, which was competing with its normal SMS service.

The situation is similar if a provider does not include data for some internet services in the inclusive data cap for its customers. For example, although a customer of "Orange Young" has an inclusive data cap of three gigabytes per month, use of the internet TV service Zattoo does not count. The competitors of such services, whose data continues to count towards the cap are discriminated against and impeded in terms of market entry because their customers risk paying additional fees for exceeding the inclusive volume.

2. **Network management** refers to interference with the prioritisation of data streams on the internet: until recently, the internet operated in a non-discriminatory manner, i.e. when multiple data streams were transmitted over the same line at the same time in the same quality. However, for some time, providers have been using means to prioritise, slow down or even block certain data streams.

Prioritisation is used, for example, in the case of the TV service "Swisscom TV", which is broadcast via a customers' internet connection. Without prioritisation, the TV picture could stall if the customer uses the internet and TV at the same time and the connection is too slow. Prioritisation can therefore be important to ensure quality in some cases.

There are also ways of targeting and slowing down certain streams. Providers argue that this reduces congestion on the network. However, measures to combat network congestion can be taken without discriminating against services, e.g. using internet tariffs which increase prices for excessive use, or temporarily slowing internet speeds for users who use the internet more than others in the event of network congestion in order to give others more bandwidth.

3. Some providers see an alternative source of income in providers of internet services, from whom they would like to demand **money for access to their customers**. This also assumes that services are impeded by providers who do not pay.

Why regulate net neutrality?

Investigations by BEREC, the body of the European telecommunications regulators, indicate that *violations of network neutrality are part of everyday life*.

In Switzerland, Swisscom violated network neutrality by discriminating against third-party internet TV providers (e.g. Zattoo) because their data, unlike that of Swisscom TV air, counted towards their customers' data cap. The example of Orange has already been mentioned. Some Sunrise subscriptions also do not count some services towards the inclusive cap.

From my point of view, the key point is that violations of network neutrality are threatening to slow down innovation on the internet: the internet currently drives innovation so well because it is very easy for internet service providers to place new services on the internet. This pace of innovation is likely to slow if providers make the decision as to which services the customer can take advantage of themselves and thereby discriminate against other services.

It should be the end customer and not the internet provider who continues to decide on the success or failure of internet services. Particularly in Switzerland, where a vibrant start-up and IT scene benefits from network neutrality, forgoing network neutrality could have negative consequences for Switzerland as a business location (cf. the statement by Karim Zekri, CEO of the Swiss internet TV provider Teleboy to the Network Neutrality Working Group). A particular problem is that internet service providers risk having to conclude global contracts with all providers for the provision of their services. This results in high transaction costs and is hardly feasible for the - often small - service providers. If we abandon network neutrality, we give preference to large providers and discriminate against SME providers, who are still responsible for the bulk of innovation today. Furthermore, we restrict the freedom of choice of internet users.

How to regulate net neutrality?

Providers should have an obligation of **transparency**: they should have to inform their customers and the regulator if they violate network neutrality. The hope is that this will result in competitive pressure on the provider and improved regulation.

Compliance with network neutrality should also become mandatory for providers.

This specifically includes a non-discrimination principle (no unobjective distinction between internet services during data transmission) and a prohibition on artificially slowing down normal internet access in favour of prioritised services.

In my opinion it would be possible to enshrine in Swiss law a transparency obligation without revision by the Federal Council of telecommunications legislation (based on Art. 12a para. 2 of the Telecommunications Act). It would also make sense to give the telecommunications regulator the competence (as occurred in the EU in 2009) to prescribe appropriate codes of conduct.

Any legal regulation should be kept abstract in view of the complexity of the issues and the need for flexibility. As illustrated, there are also cases where the violation of (strictly understood) network neutrality is not a problem (e.g. prioritisation, which may be necessary to maintain quality); flexible regulation would allow the regulator to make exceptions and to proceed with moderation.

Further reading

Simon Schlauri, Network Neutrality: Netzneutralität als neues Regulierungsprinzip des Telekommunikationsrechts, Habilitationsschrift, Baden-Baden / Zurich / St. Gallen 2010, available as PDF at <https://www.zora.uzh.ch/36715>.



NETWORK NEUTRALITY

POSITION AND DEMANDS OF THE SKS

Risks and threats from a consumer perspective

From a consumer perspective there are various risks and threats which are essential to avoid in relation to the violation of network neutrality. Specific examples from Switzerland, the EU and the USA vividly illustrate the emerging problems. Some of these examples do not represent any serious case of violation of network neutrality, but do illustrate how the situation could develop in the future. There are opportunities and incentives for internet service providers (ISPs) to decide on this strategy and there is a valid fear that this problem could also come to a head in Switzerland in the next few years.

Different scenarios

From a consumer perspective it is possible to identify various scenarios. These are listed below in order of severity of the problem:

Technical reasons determine the data discrimination

1. There may be technical reasons (e.g. network security) which justify violation of network neutrality. However, there must be a corresponding guarantee that the measures in question neither go beyond what is absolutely necessary nor that the aforementioned argument is simply used as a pretext for other, non-consumer-friendly purposes. Transparent communication with the end customer is also key in such situations.

The end user determines the data discrimination

2. It is possible that the end user must make the decision him- or herself. Although it would be the ISP that allowed differentiation with respect to data transport, it would be the individual consumer who had the choice of which services to discriminate in favour of, i.e. which specific services he or she would wish to use in better quality. This could have positive effects as the end customer would generally have a wider choice. However, the situation could develop so that certain services could be obtained only at an extra charge. To avoid any losses for consumers, it would also have to be possible to receive both the new services and the existing services, i.e. the price and quality of the current options would have to remain stable. However, a further risk of this scenario is the lack of transparency which could occur as a result of the large number of different services.

Even today, it is almost impossible for consumers to compare the various services. This problem will certainly become more acute.

ISPs determine the data discrimination

3. A key problem is the situation whereby ISPs slow down or block services with the aim of increasing their own revenues. This limits consumer choice and increases costs. In such cases, regulatory intervention by the state would be appropriate. However, there is currently no legal basis for this. It can be assumed that the risk of such a scenario increases as competition decreases. If a company has a large market presence, the company's margin is greater with regard to violation of network neutrality. In the opposite case, the competition is given incentives to acquire customers with better offers. Prevention of monopolization is therefore desirable. In this regard, it is argued that the existing Cartel Act provides sufficient opportunities to intervene. While this may be correct in theory, in practice, sole recourse to the Cartel Act would protect little. It is also questionable whether disadvantaged international providers (e.g. Skype) would take legal action, as Switzerland often represents a relatively small market for them and their resources are limited.

Demands of the SKS

- No deviation from network neutrality
- Create legal bases
- Approval for technical reasons
- Clear information and transparency for consumers

Bern, September 2014

Opinion on the report of the network neutrality working group

Network neutrality safeguards the achievements of the open internet

- Until now, users have always had free and equal access to (legal) content and applications of their choice. Providers of content and services had free access to users. They did not have to negotiate with internet providers.
- The working group has demonstrated that the open internet is as essential for innovation and growth in the global market as it is for the exercise of freedom of information and freedom of expression. Network neutrality is both a prerequisite and guarantor of an open internet.
- The report also illustrates the importance of network neutrality for the media. Today, almost all media distributes its content (exclusively or as one of its distribution channels) via the internet. Network neutrality therefore also serves to secure media diversity and pluralism.

Internet providers are establishing new business models - at the expense of network neutrality

- Internet providers want to be able to differentiate data as freely as possible during transport in order to establish new business models. These new models are aiming at additional revenue from providers of content and services.
- Vertically integrated internet providers can also discriminate in favour of their own services and content, or those which favour commercial partners over competing services, whether by using traffic management or by deliberately removing or specifically exempting services from internet subscription data caps.
- The report illustrates this with investigations of European regulators and a selection of specific examples from Switzerland and abroad. The list of examples is expanding all the time.
- Non-network-neutral practices give preference to content from internet service providers and financially strong, global content providers. The others must conform or be left standing. More and more often, users are only superficially free to decide what content and services they use.

Providers of content and services already pay for data transport

- It is not clear why content providers should have to pay each internet provider again for access to customers. They already pay for global access to the internet via their internet provider. The more data they upload, the higher the cost. Content providers also regularly use content delivery networks and thus have substantial expenditure. In doing so they ease and relieve transport between networks.
- Furthermore, customers of internet providers are only prepared to pay for internet access because of the wide range of services and content. This demand is the basis for the business of internet providers.

- Additional costs for content providers ultimately result in additional barriers to market entry and endanger the innovation cycle. Network neutrality on the other hand protects investment in innovative services and content as well as the demand for more broadband and mobile coverage.

Free differentiation of data sets false incentives

- Business models based on capacity bottlenecks remove the incentive of internet providers to expand their basic service. It is only possible to earn any revenue from content providers if capacity is scarce, for example, from the sale of "passing lanes".

Regulation of network neutrality is necessary

- Studies by European regulators and numerous documented cases of data differentiation demonstrate that clear rules are needed to prevent discriminatory practices. Discrimination by internet providers must therefore be prohibited.
- Regulation does not preclude necessary traffic management, e.g. to ensure network security or in the event of temporary capacity bottlenecks. However, if internet providers take specific traffic management measures, they must also handle the data equally.
- Internet providers can continue to sell access packages with different speeds and bandwidth, as long as they do not discriminate against content and services.
- Regulation of network neutrality does not preclude internet service providers offering specialist services (managed services). However, this must not affect the quality of the open internet and may not be misused to discriminate between competing services.

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Opinion of SWITCH on the network neutrality report

In order to guarantee a reasonable quality of internet services as data traffic increases, SWITCH is investing in needs-based network expansion. Forgoing data traffic differentiation makes it possible to keep the technical and operational complexity of the network service at a low level. This means that bandwidth expansion is less expensive and benefits all users and services equally. For SWITCH, forgoing data traffic differentiation is economically viable.

Protecting the innovation of the internet is another of SWITCH's major concerns for the benefit of their customers. SWITCH also protects this by forgoing data traffic differentiation.

About SWITCH

SWITCH brought the internet to Switzerland 25 years ago as a partner of the universities. Today, the non-profit organisation has 100 employees at its headquarters in Zurich and develops internet services for teachers, researchers, students and commercial customers. SWITCH stands for internet security.

www.switch.ch