What is net neutrality?
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(Concept paper)

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## Content

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>4</td>
</tr>
<tr>
<td>Definition of net neutrality</td>
<td>5</td>
</tr>
<tr>
<td>No blocking</td>
<td>7</td>
</tr>
<tr>
<td>No throttling</td>
<td>8</td>
</tr>
<tr>
<td>No discrimination or paid prioritization</td>
<td>9</td>
</tr>
<tr>
<td>Conclusion</td>
<td>12</td>
</tr>
</tbody>
</table>
Introduction

Issues of internet governance and regulation occupy a large space in the discussions related to digital rights, which affect all aspects of social and economic life all over the world. As part of AFTE’s interest in working on the telecommunications sector’s policies, including access to and use of the internet, this concept paper comes to start a public debate about net neutrality in Egypt, with the aim of guaranteeing the rights of internet users.

On a global level, there is much debate about how the internet can best be regulated to be a free space for interaction. This prompted a growing interest in net neutrality, as a guarantee of preserving the internet as a space for economic competition and social welfare.

The use of the internet has significantly increased worldwide, especially over the past two decades, a relatively short period of time that witnessed major leaps in the technology of communications, information, and the internet. The internet technology boom has played a major role in promoting discussion about the unknown potential and dangers of this technology and its development. To understand this development in a practical way, we can refer to one of the new technical features of the technology, which is the ability to distinguish data and communications over the internet.

The beginnings of the spread of the internet witnessed limited technical capabilities compared to the current situation, as technology tended to treat all data passing and transmitted through the internet equally and fairly without any distinction between them or a preference for accelerating the processing of some of them at the expense of others. This was due to the inability of the networks owned by companies to know the nature of applications and the data passing through them and sort them completely, in what was known as the application-blind networks. Therefore, there was no clear distinction or difference between the data. However, the development of network design prompted an increase in the sensitivity and ability of networks to know the applications and data passing through them through the application-agnostic network, which made networks more able to know what passes through them1 and map the requests and pressure on them, which is known as the traffic. This knowledge does not necessarily translate into direct interference by internet service providers (ISPs), but there is a possibility that this technology could be misused by interfering with network access capabilities.

Hence, the importance of developing a clear vision for dealing with the internet and ISPs has increased, in order to ensure that the internet will continue to be an arena for innovation, creativity and benefit to large economic and social sectors. This should be done without manipulation by ISPs or turning them into monopolistic entities that dominate the internet market and frantically rush to make profit without taking into account the consumers and the software and application developers.

In this context, the term “net neutrality” or “network neutrality” has been widely used during the last decade in particular, after years of debates and discussions about the appropriate adaptation of internet technology and its relationship to communications, as well as the internet service provision tools. In addition to this technical development, the growing demand for internet service played a role in increasing the internet traffic, represented in millions of requests sent and received by different users. This

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What is net neutrality?

Technology is heading towards more high consumption of broadband internet through complex types of services such as videos, electronic games, etc.

Hence, there have been attempts to deal optimally with that traffic in a balanced and fair manner that guarantees justice and non-discrimination in different countries and in multiple international frameworks. This is what this paper addresses by reviewing the concept of net neutrality and its basic principles.

Definition of net neutrality

The discussion of net neutrality began with discrimination and the restrictive discriminatory practices carried out by ISPs, by introducing the concept of online discrimination\(^2\). There have been attempts to monitor these discriminatory practices and direct decision makers to reject them as they might affect the values of economic competition and innovation in the information sector.

This debate has continuously developed over the past two decades, resulting in two prominent regulatory frameworks for net neutrality in 2015. These two frameworks, namely the EU Open Internet Regulation 2015/2120\(^3\) and the US Open Internet Order\(^4\), are the most prominent, clear, and detailed in the net neutrality discussions.

Other countries are witnessing attempts to regulate net neutrality, although it is not possible to mention all of them in this paper. However, the extrapolation of net neutrality experiences reveals a number of considerations that must be noted. These in-

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\(^3\) All what you need to know about the open internet rules in the EU, available at: https://berec.europa.eu/eng/open_internet/

clude the discrepancies in the definition of net neutrality. The first of these is that the multiplicity of parties or actors involved in net neutrality means differences in the definition of net neutrality depending on the priority and approach of each party, whether legal, technical or related to users. There is another discrepancy based on the local context in which there is an attempt to adopt net neutrality, which often finds its way to laws or regulations that provide varying definitions of net neutrality depending on varying priorities and drafting considerations. Moreover, the fact that net neutrality is a relatively new topic, which started two decades ago, has contributed to the different definitions of it.

In general, net neutrality can be defined as “the principle that an internet service provider has to provide access to all sites, content and applications at the same speed, under the same conditions without blocking or preferencing any content”.5

In some theses, net neutrality is defined as a position against the plurality or class of internet services (multitier internet services)6, which will have repercussions that violate the principle of end-to-end user, which means that content providers and users as points of contact at the two edges of the network are the ones who determine the use and its nature, not the core of the network, i.e. the ISPs.7

As for legal definitions of net neutrality, the EU regulators have tended to define it as the equal and non-discriminatory treatment of traffic in the provision of internet access services, where users have the full right to receive and share information over the internet in accordance with to their preferences and choices.

This right extends to their right to use any services provided via the internet or applications based on their own free will and choice. In practical terms, this means that the users’ right to receive or impart information should not be restricted by any means, whether in the form of blocking, slowing down or degrading certain contents or favoring certain contents and sites due to the users’ traffic.

This right is not affect by the devices the users use in sending or receiving their information, regardless of the content, service or application they use8. The European regulation was clear in its objective of implementing this principle, which is to serve the end user independently of even commercial and economic considerations.9

Along the same path, the US Federal Communications Commission’s (FCC) Open Internet Order proceeded with the definition of net neutrality. It distinguished between the overall objectives to be achieved and the procedural aspects that must be adopted. These objectives were summarized in preserving the freedom to access content, the freedom to use applications, the freedom to attach personal devices, and the freedom to obtain service plan information.10

Net neutrality is summarized in three basic principles (No's): No blocking, no throt-

5  https://www.thestreet.com/technology/what-is-net-neutrality-14816850
8  Recommendation CM/Rec(2016)1 of the Committee of Ministers to member States on protecting and promoting the right to freedom of expression and the right to private life with regard to network neutrality, Council of Europe, available at: https://is.gd/vIqPvL
Net neutrality is the principle that internet service providers (ISPs) should treat all data equally, without prioritizing certain types of content or services over others. This means that ISPs should not block access to any site, content, or application based on the ISP's own interests or the interests of a third party.

No blocking

Blocking or banning users' access to certain sites, contents or applications is the most famous and most obvious practice that contradicts the concept of net neutrality. It means that ISPs reject users' requests to access a particular site or content. This practice enjoys great consensus among those interested in internet governance and net neutrality, and it does not face much opposition from any party. However, it represents a blatant violation by ISPs of the users' right to access content they wish to view, after they paid for that service.

Yet, there are two exceptions where ISPs can proceed with blocking, namely:

- In the event that the content violates law. In this case, blocking must be preceded by a clear judicial order or judgment. The purpose of this exception is to keep the power of blocking away from ISPs and to ensure that they are just carriers or passers of data, keeping it a government power.
- In the event of a threat to the security of the internet or its users from malicious devices that can damage the entire network if these requests are allowed to be passed to other connection points.

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What is net neutrality?

It means that ISPs should not interfere with the requests they receive from users to access a particular content, site, or application, whether by slowing down or speeding up the access. This sort of obstruction of data processing, requests, reception and transmission of signals can make the experience of using the internet very poor, due to the slow loading and response to the user's request to access a particular site or content.

This ultimately leads the average users to leave the site or the content they want to access, due to the delay in the network's response. So, the end result is to deprive a segment of the audience or the market of access to that site or content, and vice versa. This practice does not have the same degree of rejection as blocking. The users do not often have transparent details from the ISPs about their consumption or how their requests for access have been processed. The practice leads to a conflict of interest between some platforms on the one hand and the ISPs on the other hand, thus prompting the latter to speed up the processing of some requests and slow down others. It also results in a great deal of conflict among the major players in internet management across the world, as ISPs argue that their interferences are important for several technical reasons related to the quality of the overall network management. Yet, it is difficult to know the limits of these technical reasons.

Some network administrators believe that bandwidth throttling may be motivated primarily by security considerations. In some cases, the requests sent to the network might be fake or carrying fake and harmful software, such as spams or distributed denial-of-service (DDOS) attacks, which the average user may not realize that they are loaded on his device. Some may use this software deliberately to harm the entire network or slow down or disrupt certain sites by sending too many requests to the network at the same time\(^\text{12}\). This requires the ISPs to maintain the network by slowing these requests down until they figure the problem out, especially if the network hosts

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What is net neutrality?

important and vital sites related to sectors such as health, education or other government sectors.

This restrictive practice violates the principle of competition among various sites, contents and applications. ISPs may be motivated by a desire to support one site or application at the expense of another, so they facilitate user access to it at the expense of slowing access to other contents. This eventually violates the rules of integrity and fairness in managing the information sector, affects the opportunity for the bandwidth-limited content to spread and develop, and forces users to adopt unreal behavior and preferences motivated by compulsion.

Throttling takes many forms, such as delaying the response to a user’s request over the network, responding to the request but reducing the quality of the material sent to the user\(^{13}\), or distorting the content in a way that misleads the users regarding the information or material they want to verify or use, thus causing harm to internet users.

**No discrimination or paid prioritization**

This practice happens within the same network when ISPs process the users’ requests and data unevenly, by facilitating the access for those who pay additional prices.

This discriminatory practice may take several forms, some of which may be direct and others indirect, but it ultimately includes every discriminatory and harmful treatment other than blocking. This practice stems from the increasing demand and traffic from internet users and content providers, as well as the increasing complexity of the material to be transmitted over the network.

Then the ISPs face the traffic and congestion within the single network through two clear practices, namely the discriminatory treatment of data packets and the discrim-

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\(^{13}\) Martin Peitz and Florian Schuett, “Net neutrality and inflation of traffic”, International Journal of Industrial Organization, 46 (2016), p:17
What is net neutrality?

Discriminatory processing is a pattern of discrimination in the packets of data transmitted over the internet that does not necessarily require a fee. ISPs tend to decide what gets priority access and processing first, and what requests come second and third, and so on. This means that there is a preference— in one way or another— of requests of some users at the expense of others for discretionary considerations, such as deciding what is more useful and feasible and what is entertaining or secondary, or immoral...etc.\(^\text{14}\)

The problem of this type of discrimination lies in the fact that it violates the main rule associated with the development of internet technology, which is “first-come, first-served”. This does not exist in this case. So, ISPs resort to technical tools that deliberately delay the processing of some data and accelerate the processing of others, which is known as the “traffic shaping” technique.

ISPs defend this practice by noting the limited bandwidth of the internet, making it a scarce resource that needs to be well managed based on prioritization, to ensure that no certain consumers or users get more bandwidth than other users.

The discriminatory pricing of prioritization is based on a simple concept, that is: as long as the demand and traffic on the internet are increasing, the solution may be to find fast and slow lanes within the network\(^\text{15}\). Fast lanes are given to those who pay more, while slow lanes are given to those who do not pay and can wait.

This practice directly harms the mechanism of competition in the information technology market, and reinforces monopoly by ISPs and entities that have the ability to pay ISPs to obtain better service, thus making it more available to the public, while depriving economically emerging sectors of that opportunity because they cannot afford the purchase of fast lanes.

To understand both discriminatory patterns, it is important to know the nature and types of requests and services sent over the network that a wide range of ISPs tend to rely on in justifying their discriminatory policies against the content and requests sent to their networks - which are technically correct - and which are based on a number of determinants that differentiate between the contents:\(^\text{16}\)

- **Bandwidth**: It means the maximum amount of data that can be transferred per second over each network, and it is an important factor in understanding the capacity of each network.
- **Delay**: It is the time taken to transfer a service/data packet from one point to another, so that the longer the delay, the lower the quality of the service.
- **Delay Variation**: It means the differential between the delay in sending and receiving data packets in the same stream, which, if increased, can lead to service interruption.
- **Rate of data loss during transmission**: It means the rate at which data packets are lost when transmitted. The more data packets there are, the fewer chances

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\(^{15}\) Hassan Habibi Gharakhell, “Perspectives on Net neutrality and Internet fast lanes”, ACM SIGCOMM computer communication Review, January 2016, p:5

that they will be lost during transmission, meaning that they have a greater chance to reach their destination more accurately and with higher quality.

These disparities entail a kind of hierarchy in dealing with data or requests to use the internet. This hierarchy has three layers. The first, from the bottom, includes basic and simple services that do not consume much bandwidth and do not require a certain sensitivity at the level of the previous four criteria, such as browsing and e-mail services whose quality is not affected in the event of delays in sending and receiving for a few seconds.

The second layer includes Voice over Internet Protocol (VoIP) services, such as Skype and Viber. These services have greater sensitivity to the delay in data transmission between users, which affects the quality of service and thus causes a delay in voice transmission that varies between a very few seconds to more than that.

The third layer includes video services or applications, which are of course more affected by the delay in transmission and by the rate of data packet loss during transmission. The quality and benefit of these services are affected by that delay.

Finally, the higher layer includes applications that require a high quality of internet service, where any delay or sensitivity will affect the quality and efficiency of the connection.

This distinction between basic and enhanced services means that there will be price maps within a single network, targeting content providers and sometimes end users, for each particular service.

These divisions are adopted - according to the fears of supporters of net neutrality - in concluding agreements between content providers and ISPs in order to ensure a higher quality of service, faster speed and greater access, through the so-called quality of service principle. This ultimately disadvantages smaller competitors in the information sector and economically nascent businesses, as they cannot pay for fast lanes.

There is a third pattern of discriminatory practices that can be called positive discrimination. It discriminates against some players in the internet and telecommunications market. It is the “zero rating” practice, which simply means that ISPs do not charge the customers for data use on specific applications or websites. In other words, ISPs do not count the traffic associated with these applications and websites towards the subscribers’ monthly bandwidth cap.

Under this practice, ISPs may charge a lower bandwidth-adjusted price for some applications or classes of applications. The practical result of this practice is to achieve a kind of saturation in the market of particular applications or classes of applications, thus leading the users to abandon other applications. This will ultimately remove many competitors from the IT market in favor of others who have direct interests with the ISPs.

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Conclusion

The debate about net neutrality is still open. It appears to have resulted in a global consensus about practices that harm net neutrality, as revealed by the legal and regulatory frameworks of the EU and the US, as well as the UN guiding principles on freedom of expression in the age of technology, which are frequently referred to when thinking about the formulation of domestic legislative frameworks to regulate net neutrality across the world.

However, there are still some unresolved issues related to net neutrality, most of which revolve around the optimal technical aspect of network management, especially in cases of high traffic and congestion.20