



**DECISION ISSUED BY THE
INFO-COMMUNICATIONS DEVELOPMENT AUTHORITY OF SINGAPORE**

NET NEUTRALITY

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PART I: INTRODUCTION

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PART I: INTRODUCTION

1. 'Net neutrality' is a term generally used to refer to Internet service or network providers treating all sources of Internet content equally, and the right of a consumer to access content and services on the Internet on a non-discriminatory basis. The debate over net neutrality originated in the US earlier in the decade, when some Internet Service Providers ("ISPs") imposed restrictions on connection of devices to their Internet access service, while others blocked access to certain Internet applications like Voice-over-Internet Protocol ("VoIP")¹. Supporters of net neutrality cite various ways in which ISPs or telecom network operators may discriminate or block Internet content, including forming "walled-gardens"², imposing different charges or differential treatment on Internet companies for carrying the latter group's content, imposing tiered charges for retail Internet broadband services sold to end-users, performing network management techniques such as traffic prioritisation or traffic shaping³, or blocking certain Internet content from being accessed by their end-users. Other examples of content discrimination or blocking include Internet companies or device manufacturers controlling the content that can be accessed by end-users on their Internet platforms or devices⁴.

2. The net neutrality debate currently pitches parties who argue for encouragement of network investments in one corner, against those who argue for promotion of consumer choice and innovation in the other. Proponents of net neutrality usually claim that blocking or discrimination of Internet traffic by ISPs or telecom network operators curtails consumer choice and impedes innovation. They also argue that without net neutrality rules, telecom operators have the incentive to block, degrade or impose charges for specific Internet content in favour of their own services, thereby harming competition and restricting consumer choice.

¹ Source: http://en.wikipedia.org/wiki/Network_neutrality_in_the_United_States

² Walled-gardens generally refer to where network/platform operators or device makers approve content/service that will be exclusively deployed or offered on their network/platform/device.

³ Refers to the delay of Internet data packets or prioritisation of certain data packets to control the Internet traffic in order to optimise the network performance or increase usable Internet bandwidth.

3. On the other hand, opponents of blanket net neutrality rules assert that telecom network operators and ISPs have the right to optimise the use of their network resources and charge Internet companies or content providers for use of their broadband networks to reach end-users. Restricting the network operators' or ISPs' abilities to recoup their network costs will undermine future investments and deployment of broadband infrastructure. They also opine that Internet traffic shaping or traffic prioritisation measures are necessary to ensure a reasonable Quality of Service ("QoS") standard for all users of the Internet, as otherwise heavy users who download or upload massive amounts of data will hog the Internet bandwidth and degrade the Internet access experience of other users. Moreover, it has also been highlighted that it is in fact debatable whether the Internet was ever truly 'neutral', given that Internet traffic transmission functions on a 'best effort' basis without guaranteed transmission. Network operators and ISPs are thus increasingly finding ways to manage their Internet bandwidth and network and/or offer different tiers of service levels (for example, in terms of guaranteed bandwidth, access speeds and latency) to end-users.

4. IDA has been monitoring the developments in net neutrality, and issued a public consultation on "Net Neutrality" on 11 November 2010 ("Consultation Paper") to seek views on the current state of net neutrality developments in the Internet access service market and potential future developments, as well as IDA's policy approach towards net neutrality. At the close of the consultation, IDA received comments from 18 respondents:

- (i) Anagran Inc.
- (ii) AT&T Worldwide Telecommunications Services Singapore Pte Ltd
- (iii) BT Singapore Pte Ltd
- (iv) Cisco Systems
- (v) Desmond Cheong
- (vi) ESPN Star Sports
- (vii) Google Asia Pacific Pte Ltd
- (viii) Keystone Law Corporation
- (ix) Khong Heng Poh
- (x) M1 Limited
- (xi) Moratel International Pte Ltd

⁴ For example, a smartphone device maker imposing approval requirements on content and service applications to be uploaded to its online store, exclusively or otherwise.

- (xii) Pacnet Internet (S) Limited
- (xiii) Qualcomm International
- (xiv) SES
- (xv) SingTel Group
- (xvi) Skype Communications S.a.r.l.
- (xvii) StarHub Group
- (xviii) SuperInternet Access Pte Ltd

5. IDA thanks all respondents for their inputs. IDA has reviewed the comments received, and this document sets out IDA's clarifications on the net neutrality policy framework and further areas of review to provide greater certainty to the industry and enhance protection for consumers.

PART II: SUMMARY OF RESPONSES AND IDA'S DECISION

Current state of net neutrality developments in the Internet access service market and potential future developments

6. Most of the respondents opined that developments in the local Internet access service market have been healthy with no significant problems related to traffic blocking or discrimination. Some respondents noted that going forward, network management and traffic prioritisation will become increasingly important as Internet traffic continues to grow. Different Internet services and applications may require differing network requirements, and ISPs, network operators and Internet content players may evolve their service models to address specific needs or niche users.

7. As explained in the Consultation Paper, our local consumers and businesses have access to a wide variety of Internet access service packages in the market today, delivered over various technology platforms ranging from asymmetric digital subscriber line (“ADSL”) technology over copper-line access network, co-axial cable broadband networks, to fibre-based broadband networks using technologies such as Gigabit Passive Optical Network (“GPON”) and mobile broadband technologies. With the flexibility to innovate and differentiate their Internet broadband service offerings, ISPs have come up with new or value-added services such as online storage, music stores or applications stores to distinguish themselves from their competitors. The competition among the ISPs has benefited end-users who are able to select from a wide variety of Internet access services for one that best suits their needs.

8. To date, IDA has not observed any instance of blocking⁵ or discriminatory treatment of legitimate Internet content by local ISPs or telecom network operators. IDA also recognises the rapid growth in Internet traffic going forward, given the deployment of higher-speed broadband networks and growing usage of the Internet. In particular, traffic over the mobile broadband networks is likely to increase given the rising number of users accessing Internet content and mobile

⁵ Apart from those required under the Media Development Authority's regulations.

data services and applications over wireless and mobile devices. While developments in the local Internet access service market have been healthy, IDA notes that there is an increasing number of end-users who are dissatisfied with their Internet broadband access services, ranging from service quality to experienced access speeds, for both fixed and mobile Internet broadband services. Hence, while it is important to facilitate innovation and economic efficiencies on the Internet by providing flexibility for ISPs, network operators and Internet companies to innovate and differentiate their service offerings, there is a need to ensure that consumer interests are adequately protected given the growing reliance on both fixed-line and mobile Internet broadband services.

IDA's policy approach towards net neutrality

Broad policy approach and prohibition on blocking of Internet content, applications and services

9. In the Consultation Paper, IDA explained our three-pronged policy approach towards net neutrality. The first prong seeks to facilitate a competitive Internet access market via IDA's Telecom Competition Code ("TCC"), as competitive forces will reduce the incentives for ISPs and telecom network operators to engage in blocking or discriminatory conduct that restricts consumer choice. The second prong focuses on improving information transparency so that consumers can better understand the various Internet broadband service choices when selecting an Internet broadband package. In this regard, IDA currently publishes "A Guide to Residential Broadband in Singapore"⁶ which covers comparisons of Internet broadband service prices and performance, and IDA also requires ISPs providing fixed-line Internet access services to residential users to publish information on their network management practices⁷. The last prong aims to protect consumer interests and to ensure that consumers enjoy a reasonable quality of Internet access via IDA's QoS requirements on network availability and latency for fixed-line Internet broadband services⁸. In line with this prong, ISPs

⁶ This is available at: <http://www.ida.gov.sg/Publications/20061213184450.aspx#performance>

⁷ The ISPs' publications can be found at:
<http://www.ida.gov.sg/Publications/20090602161114.aspx>

⁸ The QoS requirements are imposed on ISPs (serving residential and/or business customers) with more than 10% of the market share, and the detailed requirements can be found at:
http://www.ida.gov.sg/doc/Policies%20and%20Regulation/Policies_and_Regulation_Level2/20060

and network operators are prohibited from blocking legitimate Internet content, but have the flexibility to manage their network and offer niche or differentiated Internet service offerings that meet IDA's fair competition rules, information transparency and QoS requirements.

10. Most commenters support IDA's broad policy approach of prohibiting blocking of legitimate Internet content, facilitating competition, providing flexibility for ISPs and network operators to manage their networks and differentiate their service offerings, and safeguarding consumer interests via information transparency and minimum QoS requirements. Many also agreed that fostering competition is key to ensuring the healthy development of the market for the benefit of consumers, and that IDA's current regulatory frameworks, including the TCC, are adequate in promoting competition. One respondent, while supporting IDA's policy approach in general, noted that traditional competition law and the TCC may be inadequate in covering issues involving discriminatory players who are not considered dominant, or those who are 'edge providers'⁹ who are not licensed and have no recourse under the TCC.

11. IDA is of the view that our policy approach towards net neutrality remains sound. The three-prong framework takes a balanced and pragmatic assessment of consumer needs and business interests, in facilitating competition and consumer choice, and affording flexibility to ISPs, network operators and Internet companies to innovate in their service offerings. In facilitating competition, IDA's TCC guards against abuse of significant market power and anti-competitive behaviour, which is in line with international competition law principles. It also mandates interconnection between telecom licensees and guards against other unfair methods of competition such as degradation of service availability or quality without legitimate business, operational or technical justification¹⁰. In addition, IDA's regulatory framework, including the TCC, ensures that basic consumer interests are protected via basic duties, QoS requirements and any IDA

424141236/Qos_webpage_bb.pdf. The publication of the ISPs' QoS performances can be found at: <http://www.ida.gov.sg/Policies%20and%20Regulation/20060424142032.aspx>

⁹ Generally referring to Internet companies who provide content, services and applications over the Internet to end-users.

¹⁰ Section 8.4.2.1 of the TCC.

directions that our licensed providers must abide by. While IDA's regulatory framework and the TCC govern behaviours of IDA licensees, Singapore has also put in place a general competition law which governs players who are not IDA licensees, including Internet content companies and 'edge providers'.

12. IDA recognises that the Internet landscape is evolving and consumer usage patterns has changed over the years, especially with the development of mobile Internet broadband services. Today, more consumers are accessing Internet content over mobile devices such as smartphones and tablets. In addition to surfing Internet content available on the World Wide Web ("WWW")¹¹, users are also accessing stand-alone mobile applications that only offer specific Internet content, for example, a mobile banking application that only allows the user to access his banking account. In view of such developments, IDA would like to clarify key aspects of our net neutrality policy approach, and would also be undertaking reviews of possible enhancements in the consumer protection measures, as explained in the following sections.

Scope of net neutrality policy

13. IDA would like to clarify that the net neutrality policy and prohibition of blocking of legitimate Internet content applies to fixed-line, wireless and mobile Internet services. Legitimate content refers to all content that is not considered unlawful under local legislation and regulations¹². Nonetheless, end-users *cannot expect* access to content that is restricted by content owners for various purposes, for example, within a closed-user group (such as social networking sites or personal blogs) or for commercial reasons (such as online newspapers allowing access to paid subscribers only), unless the content owners grant access. Business or premise owners (for example, cafes or retail malls) also have the flexibility to design their access policies to provide only certain Internet

¹¹ The World Wide Web, also known as the Web, is a system of interlinked hypertext documents accessed via the Internet. With a web browser, one can view web pages that may contain text, images, videos, multimedia and navigate between them via hyperlinks (source: Wikipedia).

¹² For example, under the Media Development Authority's Internet Code of Practice, material that is prohibited for broadcast to users via the Internet in Singapore is deemed unlawful, and such material include those that depict nudity or glorify racial or religious hatred.

content for their employees, tenants or customers, as part of their company or tenancy policy and commercial requirements.

Flexibility for service differentiation and network management

14. In the consultation, some respondents welcomed the flexibility for network management and service differentiation. They opined that network management is essential to manage the growth in Internet traffic and to ensure a reasonable quality of access for consumers, and service differentiation allows for new innovations and business models to evolve for the benefit of consumers. Other respondents however opined that ISPs should be prevented from deploying traffic management techniques that impact user access to the Internet, and that merely prohibiting blocking of Internet content may be inadequate if ISPs are allowed to deploy network management practices that discriminate against certain applications such that the applications are rendered unusable by consumers. Hence, one of the respondents suggested that IDA should issue clear guidelines and boundaries on what constitutes reasonable network management.

15. As can be seen from the slew of new content, applications and services introduced on the Internet, consumers and businesses have benefited from innovations in new business models, technological solutions and service delivery methods developed by the ISPs, network operators, platform or device makers, and Internet companies. Such service innovations are essential for the development of the Internet ecosystem and are only possible where the ISPs, network operators, platform or device makers and Internet companies have the flexibility to differentiate their services to meet the needs of changing customer demands or niche user groups. At the same time, ensuring a reasonable quality of access to the Internet is important for end-users to be able to reap the social and economic benefits of these new content and service innovations. Hence, IDA maintains the view that ISPs and network operators should be allowed flexibility to manage their network or differentiate their service offerings, but must abide by IDA's fair competition rules, information transparency and minimum QoS requirements, as well as the prohibition of blocking of legitimate Internet content.

16. To clarify, ISPs or network operators can offer specialised or customised Internet content, applications and services based on commercially negotiated arrangements or specialised terms and conditions. They are also allowed to perform reasonable network management practices provided that IDA's QoS and information transparency requirements are adhered to. However, they cannot impose discriminatory practices, restrictions, charges or other measures which, while may not be viewed as outright blocking, will render any legitimate Internet content (for example, a website, application or service) effectively inaccessible or unusable. Complaints on such anti-competitive effects or where consumer interests are harmed will be dealt with on a case-by-case basis under IDA's regulatory frameworks.

17. IDA is cognisant that traffic management techniques may be deployed to such an extent that traffic packets are effectively blocked. As highlighted above, such practices that effectively render a website, application or service inaccessible or unusable may constitute blocking, even though in a technical sense, packets can still be transmitted. Nevertheless, the advances and developments in network management techniques and the importance of providing sufficient flexibility to ISPs or network operators to manage their network efficiently may render any guidelines and restrictions on network management quickly impractical and irrelevant. Therefore, traffic management practices that are found to be anti-competitive or to harm consumer interests will be dealt with on a case-by-case basis. In addition, IDA's information transparency requirement on fixed-line ISPs to provide disclosure on their network management practices helps end-users better understand how their Internet surfing experience will be affected, to help them make an informed choice. Coupled with the QoS requirements on the ISPs, IDA believes that these would provide sufficient safeguards against abusive network management practices.

QoS requirements

18. Some of the commenters supported the imposition of QoS requirements, while others opined that QoS requirements are not necessary in today's market,

given that competition among the various ISPs allow customers to choose the service quality that best suits their needs. It is also difficult for ISPs to guarantee certain minimum quality service levels as the Internet traffic traverse external networks which are not within their control.

19. IDA believes that in today's market, QoS requirements are necessary to facilitate a reasonable quality of Internet access for end-users, as well as to ensure that fierce competition does not lead to ISPs or network operators degrading the Internet access service quality to end-users in their bid to compete on price or to lower cost. IDA's current QoS requirements for Internet broadband access services are imposed on ISPs providing fixed-line Internet broadband access services¹³, and mandate standards on network availability and latency¹⁴. In addition, IDA also monitors the data throughput of these ISPs. Moving forward, with the growth in usage of mobile Internet broadband, IDA will study mandating QoS requirements on ISPs providing mobile Internet broadband services. IDA will also continue to monitor the QoS standards for fixed-line Internet broadband and review the need to enhance these QoS requirements in order to ensure that end-users can continue to enjoy a reasonable quality of Internet access.

Information Transparency

20. Some of the respondents agreed that enhancing information transparency is important to protect end-users and help them make an informed choice. While supportive, some also noted that there should not be overly detailed and excessive information provided as these would overload consumers and create confusion. On the other hand, some commenters objected to IDA's proposal in the Consultation Paper for ISPs to inform end-users of typical Internet access speeds achievable for their Internet broadband services, highlighting that Internet broadband access speeds are affected by many factors, some of which are out of the ISPs' control. They opined that it would be challenging to measure or

¹³ Those with more than 10% market share in the residential and business broadband Internet access markets.

¹⁴ The QoS standards mandate an average 99.9% network availability (which measures the degree to which the ISPs' networks must be operable and not in a state of failure), as well as average latency of below 50 millisecond for local network access and below 300 millisecond for

estimate meaningful figures for actual Internet broadband access speeds, and that measuring such access speeds would impose costs on ISPs.

21. IDA has observed that today, local ISPs generally advertise their fixed-line and mobile Internet broadband access plans using references to the theoretical maximum download access speeds. Some advertisements for 3G mobile plans that offer data downloads also do not clearly indicate any download speeds. However, IDA notes and welcomes the recent announcements by service providers like SingTel to publish typical speeds of some of its Internet broadband services and others like StarHub and M1 who are looking to do the same¹⁵, as IDA believes that these efforts are a step in the right direction to provide information transparency and help consumers better understand the different Internet broadband plans on offer. IDA believes that without sufficiently clear information on the Internet broadband access speeds that end-users can expect to experience, it will be difficult for end-users to make informed choices on Internet broadband plans, even in a competitive market. Even though there are available online tools (such as www.speedtest.com) for end-users to measure the actual Internet access speeds they are experiencing, these tools are useful only for end-users who have already subscribed to Internet broadband plans. Non-subscribers are not able to conduct such speed tests for the different Internet broadband plans in the market prior to subscription. While IDA also currently publishes “A Guide to Residential Broadband in Singapore”, this guide does not reflect typical speeds for all available Internet broadband plans.

22. IDA acknowledges that various factors¹⁶ can affect the Internet broadband access speed experienced by an end-user. However, IDA believes that measuring and publishing the typical Internet broadband speeds using a methodology that is based on a reasonable set of operating conditions would provide end-users a meaningful indication of the access speeds they can expect to achieve. Given that the maximum theoretical broadband Internet access

international network access (which measure the time delay experienced to access local Internet content and international Internet content).

¹⁵ As can be seen from recent news articles such as the Straits Times’ 14 June 2011 article on “SingTel Discloses Average Surfing Speeds”.

speeds advertised by the ISPs are often not achievable, it is reasonable for ISPs to provide information on the typical access speeds experienced by end-users, prior to end-users entering into subscription contracts for these services with them. Hence, in March 2011, IDA had issued a decision for ISPs to measure and publish the typical Internet broadband download speeds that consumers can expect to experience¹⁷. IDA is currently working with the ISPs to finalise the measurement parameters and publication requirements, taking into consideration the factors that can affect Internet broadband speeds and the costs of measuring and publishing such information. IDA expects all ISPs to start publishing their typical download access speeds by early 2012.

23. The publication of typical Internet broadband download speeds by the ISPs, together with the existing disclosure of network management practices by ISPs providing fixed-line Internet broadband, and IDA's current publication of "A Guide to Residential Broadband in Singapore", will provide a suite of information on Internet broadband services to help end-users better understand the various service packages on offer. Moving forward, IDA intends to study the feasibility for ISPs providing mobile Internet broadband services to disclose their network management practices, as well as review whether the current publications of information related to Internet broadband services are sufficiently useful and clear for end-users. IDA notes that the various information disclosures on network management practices and typical Internet broadband access speeds by the ISPs could possibly be aligned or streamlined to prevent confusion and improve ease of understanding for consumers.

Other comments to the Consultation Paper

24. One respondent observed that even with information transparency measures, many consumers may not fully understand the effect of network management practices on their Internet surfing experience, until they subscribe to and use the Internet broadband service. Hence, the respondent suggested that

¹⁶ Some of these factors may be out of the ISPs' control, for example, an end-user's hardware configuration or the performance of a particular Internet website's server.

¹⁷ More information on IDA's decision can be found at:
<http://www.ida.gov.sg/News%20and%20Events/20110314122636.aspx?getPagetype=20>

consumers should be given a ‘cooling down’ period after purchase of their Internet broadband service during which they can terminate the service if they are unsatisfied about the impact of the ISPs’ traffic management practices on their Internet surfing experience. Related to this, another commenter noted that even in a competitive market, consumers who wish to change their Internet broadband plans may be discouraged by the switching costs imposed by the ISPs.

25. IDA recognises that even with information transparency on network management practices and typical broadband speeds, some consumers may not fully understand how these would impact their Internet surfing experience. Hence, IDA is prepared to assess the feasibility of introducing the concept of a ‘cooling down’ period for consumers, and this review will need to take into consideration the consumer benefits (such as the ease of terminating services or seeking recourse for unsatisfactory service levels), versus the impact and costs on the ISPs (for example, increase in complexity in customer acquisition and termination processes and costs of ceasing services). However, as this review has wider implications on the provision of telecommunication services in Singapore, IDA will need to study this issue separately.

26. In summary, IDA’s policy approach towards net neutrality is:

<p>No blocking of legitimate Internet content</p>	<ul style="list-style-type: none"> • ISPs and telecom network operators are prohibited from blocking legitimate Internet content • ISPs and telecom network operators cannot impose discriminatory practices, restrictions, charges or other measures which, while not outright blocking, will render any legitimate Internet content effectively inaccessible or unusable
<p>Comply with competition & interconnection rules</p>	<ul style="list-style-type: none"> • ISPs and telecom network operators must comply with IDA’s competition and interconnection rules in the TCC
<p>Provide Information Transparency</p>	<ul style="list-style-type: none"> • ISPs and telecom network operators must comply with IDA’s information transparency requirement and disclose to end-users their network management practices and typical Internet broadband download

	speeds
Meet Minimum QoS standards	<ul style="list-style-type: none"> • ISPs must meet the minimum broadband QoS standards to ensure a reasonable broadband Internet experience for end-users • Reasonable network management practices are allowed, provided that the minimum Internet broadband QoS requirements are adhered to, and that such practices will not render any legitimate Internet content effectively inaccessible or unusable
Niche or differentiated Internet services allowed	<ul style="list-style-type: none"> • ISPs and telecom network operators are allowed to offer niche or differentiated Internet service offerings that meet IDA’s information transparency, minimum QoS and fair competition (including on interconnection) requirements.

IDA believes that the above policy position will continue to facilitate consumers’ access to content and services on the Internet, while providing flexibility for ISPs, network operators, platform or device makers, and Internet companies and content providers to differentiate their services for economic efficiencies and innovation.

27. With the next 12-18 months, IDA will undertake reviews of: (a) QoS requirements imposed on ISPs that provide fixed-line or mobile Internet broadband services; (b) enhancing the information transparency requirements imposed on ISPs that provide fixed-line or mobile Internet broadband services, and (c) assessing the feasibility of introducing the concept of a ‘cooling down’ period for consumers. As part of these reviews, IDA may consult the industry and the public. IDA will also continue to monitor developments in the Internet access service market, as well as net neutrality-related regulatory developments in overseas jurisdictions, to assess if further enhancements to IDA’s regulatory frameworks are required. IDA will seek further comments and inputs from relevant stakeholders on any regulatory enhancements or new requirements and implementation details before IDA decides on these regulatory requirements.