NETFLIX

Aileen Chia
Deputy Director-General (Telecoms & Post)
Infocomm Development Authority of Singapore
10 Pasir Panjang Road
#10-01 Mapletree Business City
Singapore 117438

VIA EMAIL

Dear Ms Chia,

Please find attached the comments of Netflix, Inc. on IDA's IP transit and peering consultation paper.

While Netflix has not entered the Singapore market, our service is available in more than fifty countries, and we have encountered similar competition issues in many of them. Our comments are written from that perspective.

We hope you find this submission useful and that you will not hesitate to contact us if you have any questions.

Sincerely,

/s/
Colin Bortner
Director, Global Public Policy
Netflix, Inc.

Internet Protocol Transit and Peering Landscape Consultation

Comments of Netflix, Inc.

Contents

Summary

Netflix submits this response to the IDA Paper on The Internet Protocol Transit and Peering Landscape In Singapore ("IDA Paper") published by the Infocomm Development Authority of Singapore ("IDA"). Netflix operates in nearly fifty countries and has significant expertise delivering content to consumers in markets with varying levels of broadband competition. Netflix offers this comment to help IDA meet its goals of: (1) improving the local Internet services market, (2) minimizing incidences of local traffic being tromboned via a longer indirect path overseas, and (3) supporting Singapore's growth as a competitive business hub in the region.[1]

In markets where a small number of retail service providers have significant market power, interconnection fees can be used to limit competition. Netflix recommends the IDA revisit its conclusion that there is no need for regulatory intervention in the interconnection market and instead consider requiring settlement free interconnection among retail service providers and Internet content providers at carrier neutral facilities, such as the Singapore Internet Exchange ("SGIX").

Statement of Interest

Netflix is the world's leading Internet television network with over 57 million members in nearly fifty countries enjoying more than two billion hours of television shows and movies per month.

[1] *The Internet Protocol Transit and Peering Landscape in Singapore* at Par. 7, Consultation Paper (Rel. February 13, 2015) ("*IDA Paper*").

Netflix does not currently offer service in Singapore, but shares a common goal with the IDA: encourage broadband competition to better serve consumers.[2] Netflix has a great deal of experience interconnecting with retail service providers ("RSPs") through our single-purpose content delivery network ("CDN"), Netflix Open Connect.

Netflix Open Connect is designed to provide our millions of members the highest quality of experience possible through collaborative efforts with RSPs. We partner with hundreds of RSPs in our operating markets to localize traffic, providing substantial savings in transit and transport while optimizing service performance. In some broadband markets, RSPs have exercised market power to impose unwarranted fees on Netflix. We base this comment on those experiences.

Previous IDA Interventions and Measurement Activity

IDA recognizes that a competitive broadband market will secure Singapore's footing "as an infocomm hub and open new doors to economic opportunities, business growth and social vibrancy."[3] To this end, IDA initiated its Next Generation National Broadband Network plan ("NBN"), which is composed of three uniquely managed layers: wholesale fiber, wholesale bandwidth, and retail service.[4] IDA recognized that the NBN depended on RSPs exchanging traffic and required them to enter into interconnection agreements.[5] IDA also established SGIX, where RSPs can interconnect efficiently and cheaply.[6] In principle, RSPs are on a level playing field to compete on price and quality of service because they share infrastructure, are required to interconnect, and have similar costs.

IDA has embarked on programs to measure the performance and pricing of various RSPs.[7] IDA's approach is more comprehensive, and provides more useful information for consumers and the marketplace compared to similar efforts around the globe. In part from these

---

[2] *See, IDA Website*, (accessed on March 25, 2015), *available at:* http://www.ida.gov.sg/Policies-and-Regulations/Overview ("creating an infocomm environment that allows free and fair competition, so that consumers' interests are protected and they benefit from greater choices and the proliferation of innovative infocomm products and services").

[3] *See,* IDA Webpage, (accessed on March 25, 2015), *available at:* http://www.ida.gov.sg/Infocomm-Landscape/Infrastructure/Wired/Next-Gen-NBN

[4] *See,* IDA Webpage, (accessed on March 25, 2015), *available at:* http://www.ida.gov.sg/Infocomm-Landscape/Infrastructure/Wired/Next-Gen-NBN/What-is-Next-Gen-NBN/Industry-Structure

[5] *IDA Paper* at Par. 10(a)(ii), (The Telecom Competition Code required RSPs to interconnect, via direct peering relationships or through transit).

[6] *IDA Paper* at Par. 5.

[7] *See, Price and Performance of Residential Broadband Service Plans in Singapore,* IDA webpage, (accessed on March 25, 2015), *Available at:* http://www.ida.gov.sg/applications/rbs/chart_locnet.html *and IDA Paper* at Appendix A (summarizing the results of the 2013 IDA study of the Internet Protocol Transit and Peering landscape in Singapore).

measurements, IDA came to the conclusion in the IDA Paper that there is no need for further regulation of interconnection practices. Netflix disagrees with this conclusion.

The light that IDA's measurement program sheds on the industry does not (and cannot) illuminate all problems around peering and transit in Singapore. When competitive retail service providers are forced to pay high interconnection and transit fees to the dominant providers, traffic will not be routed through international transit to reach end users (geographical international tromboning, referred here on out as "tromboning"), nor will it be congested at points of interconnection. There will be no impact on performance or large discrepancy in broadband prices: it will be an invisible disadvantage for every competitor.

Paid Peering Is an of Exercise of Market Power

Dominant retail service providers have the incentive and ability to extract rents that raise rivals' costs and maintain upward pressure on broadband prices.[8] The IDA does not require a specific type of interconnection arrangement among RSPs; they can use settlement-free peering, paid peering, or transit.[9] Despite the illusion of choice, competitive RSPs are forced to pay for paid peering from the dominant RSPs.

Dominant retail providers generally have settlement-free peering agreements with each other, but refuse to peer or to provide adequate capacity to competing retail providers, the majority of which have open peering policies.[10] Instead, as is the case in Singapore, the dominant RSPs charge competing RSPs for peering or force them to buy more expensive transit services from third parties, and many of these transit routes trombone traffic.[11] These fees tilt the level playing field, cement the dominant retail providers' positions, and cause higher prices for consumers.

---

[8] *Singtel Annual Report 2014* at 19, *available at:* http://info.singtel.com/sites/default/files/invrel_areports/Singtel_AR2014_b.pdf, p.19 (Singtel has a 58% market share of the fibre broadband market) *and StarHub Reports 2014 Fourth Quarter and Full Year Results*, *available at: http://www.starhub.com/about-us/newsroom/2015/february/starhub-reports-2014-fourth-quarter-and-full-year-results.html* (Starhub has 469,000 broadband subscribers. By our estimation, this results in a market share between 34 and 44%).

[9] *IDA Paper* at Par. 10(a)(ii)

[10] *See*, *Id.* (the IDA's study found that settlement free peering arrangements "usually occur between two operators of similar size and traffic volume" and that there are "50 service operators interconnecting in SGIX, with more than half of these adopting an 'open' peering policy").

[11] *See, Peering Networks Detailed View,* (accessed on March 25, 2015), *avaialble at:* https://www.peeringdb.com/private/participant_view.php?id=901 (SingTel has no peering locations in Singapore, requiring providers to use international transit to reach one of their international peering locations or pay for local peering.) *and IDA Paper at* footnote 15 ("domestic routing tends to be marketed as a premium product").

Effect of Tromboning on Competitive Service Providers

Tromboning is both more expensive and less robust than direct interconnection. This is why service providers in Singapore try to avoid it.[12] Even when transit providers have settlement-free peering agreements with RSPs at the international exchange point, the underlying costs of peering and domestic transit are much lower than routing traffic overseas. International routes are significantly longer, use specialized deep-sea optical fiber cable, and pass through more routing equipment than domestic routes. These factors not only make tromboning traffic more expensive, it impacts latency. The IDA Paper asserts that tromboning traffic within the region is unlikely to have a discernible impact on performance.[13] This is not consistent with our experience nor the less-stringent quality of service guarantees included in transit provider's agreements with RSPs.[14]

Low Instances of Tromboning Is Not Illustrative of A Healthy Interconnection Market

The IDA Paper found that tromboning represents a low percentage of all locally-bound traffic. [15] But this does not mean that anticompetitive conduct by dominant RSPs does not persist.

There are two reasons why the percentage of tromboned traffic may be low while dominant retail providers are exercising market power at interconnection. *First,* the price of paid peering is intentionally set to encourage the competitor to pay for peering. Dominant providers set the price of paid peering just below the price of overseas transit because their strategy to extract rents from competitors has failed when traffic trombones and all revenue goes to transit providers. Even if IDA found that no traffic were tromboned, it would not disprove that dominant providers were using their market power to disadvantage competitors. Conversely, it would be possible for there to be zero instances of tromboning if the dominant RSPs were simply not losing any potential rents to international transit.

Second, there is little incentive for competitive RSPs to refuse to pay for peering with a dominant provider as a negotiating strategy. Refusal by the competitive RSP to pay for peering would impose the higher costs of international transit on both the competitive RSP and the dominant RSP. However, the impact of those high costs would disproportionately

[12] *IDA Paper* at Par. 10(b) ("...Operators would tend to offload traffic as soon as possible, with minimal detours from its geographical origin to minimise costs associated with long distance IP Transit").
[13] *Id.*
[14] *See Id.,* (noting that IP transit service service without guaranteed domestic routing may have compromised service quality).
[15] *Id.,* at Par. 18, ("The amount of Internet traffic that is tromboned overseas is very small, approximately 5% or less, as most of the Operators would have the commercial incentives to route locally-bound traffic locally.")

harm the smaller provider.[16] The increase in traffic delivery costs would be much more significant for the competitive RSPs should it refuse to pay for peering.[17]

Claims by large RSPs and the conclusion in The IDA Paper that settlement-free peering with smaller RSPs is less efficient than using transit are incorrect.[18] SGIX provides at-cost interconnection and port capacities as low as 100 Mbps.[19] Even without the cost savings provided by SGIX, the underlying costs of direct interconnection are much lower than overseas transit.

Paid Peering harms the Competitive Broadband Marketplace

Paid peering arrangements harm the broadband marketplace by raising the price for broadband services. The direct result of paid peering is a unique revenue for the dominant retail providers and a unique cost for their competitors. This sets a floor for consumer broadband prices, harming consumers. To avoid losing market share, dominant RSPs only need to price their consumer broadband service at the the competitive RSP's lowest price, which is unnecessarily higher due to the added costs of paid peering. There is no incentive to continue lowering rates. Switching costs for consumers[20] may even enable dominant RSPs to price just above competitive RSPs while still retaining market share.[21]

Effect on Content Providers and CDNs

The distortion of competition by paid peering fees does not exist only between competitive and dominant retail service providers. The dominant providers have clear incentives to impose high interconnection fees on CDNs and content providers: (1) they want to extract

---

[16] Most consumers and businesses in Singapore are located on the dominant RSPs' networks, so nearly all of the competitive RSP's locally bound traffic would need to use international transit. Conversely, a much smaller proportion of the dominant RSP's locally bound traffic would need to use international transit, as most consumers and business are on its own network, or the network of another dominant RSP with whom that provider has a settlement-free peering arrangement.

[17] As a percentage of total traffic delivery costs. It is possible that the volume of traffic being delivered by the dominant ISP be greater, as their total traffic volume is greater.

[18] *IDA Paper* at Appendix A, Par. 5.

[19] *See, Singapore Internet Exchange,* IDA webpage, (accessed on March 25, 2015), *available at:* http://www.ida.gov.sg/Infocomm-Landscape/Infrastructure/Singapore-Internet-Exchange; *SGIX Port Charges,* IDA webpage, (accessed on March 25, 2015), *available at:* http://www.sgix.sg/joinus/port-charges/, *and Singapore Internet Exchange*, IDA Presentation (June 15th, 2010), *available at:* http://www.ida.gov.sg/images/content/Infrastructure/nbn/images/pdf/3_SGIX.pdf ("port utilization above 5.4% would result in cost savings over transit")

[20] Both the actual economic costs of switching and the difficulty of switching. Also, bundled packages may incentivize customers to purchase their Internet service in conjunction with multi-channel video service. Not all competitive RSPs offer multi-channel video service.

[21] *See, Price and Performance of Residentual Broadband Plans in Singapore,* IDA webpage, (accessed on March 25, 2015), *available at:* http://www.ida.gov.sg/applications/rbs/chart.html

rents from anyone needing to deliver traffic to end users on their networks and (2) in the case of video services like Netflix, dominant RSPs would want to protect their affiliated video businesses by driving up such competitors' costs.

Netflix has built its own content delivery network and offers to interconnect directly with broadband providers free of charge. These arrangements increase network efficiency, reduce RSPs' costs and improve service to consumers. The vast majority of these arrangements are done on a settlement-free basis. However, in many of these markets, the largest providers have leveraged their market power to demand interconnection fees that do not reflect the actual costs of interconnection or the mutual benefits of interconnection.[22]

Internet content providers like Netflix, when entering the market, could be forced to pay high interconnection fees to the dominant providers or pay for transit service. While IDA launched NBN and built SGIX to encourage entry into the Singapore market, content providers and CDNs would have to weigh the efficiencies of installing local infrastructure in light of high interconnection fees.

Conclusion

Allowing incumbency to grant retail providers a structural advantage by way of interconnection arrangement undermines the goals of NBN and lead to higher prices for broadband service. Consumers are denied the benefits of having many, vigorously competitive retail service providers, including lower prices and better service. Additionally, high interconnection fees create barriers to market entry for content delivery networks and content providers like Netflix.

For these reasons, IDA should revisit its conclusions and consider requiring that retail service providers enter into settlement-free peering agreements with each other and with Internet content providers, which provide adequate capacity and performance to the retail service provider's customers. In order to prevent this from becoming overly burdensome, and to ensure that competitive RSPs are not charged other fees[23] to reach the dominant RSPs' networks, IDA should only require that such peering agreements are concluded within carrier-neutral facilities such as SGIX.

[22] *The Case Against ISP Tolls,* Netflix Blog Post, (April 24, 2014), *available at:* http://blog.netflix.com/2014/04/the-case-against-isp-tolls.html

[23] Such as excessive charges for rack space, power, or local loops.