Introduction & License

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Topic
Consultation on Singapore's Internet Protocol Transit and Peering Landscape – A neutral and independent viewpoint

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Summary

Personally, it seems like the document “Consultation on Singapore’s Internet Protocol Transit and Peering Landscape” tries to convince the normal reader that everything is OK in Singapore.

Maybe my different viewpoint is totally wrong, but maybe it still can highlight some of the problems and conflicts which exist in the internet landscape in Singapore.

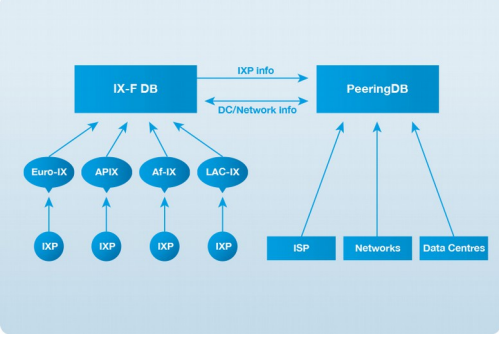
I tried to understand the different needs of the 3 Groups of ASNs in Singapore, I gave them a specific name to group their interest better in the document. The biggest group is of course the localASN [13] followed by the stubASN [14] and the big3ASN [12].

At the beginning of my research I had the impression that the big3ASN are dominating the local IP transit market, but the figures showed that I'm totally wrong. The overall market share of the big3ASN is below 20%, means that 80% of the market is realized with localASNs connecting the stubASNs. I also realized that over 1/3 of the localASN are only Singlehomed, but I did not found any relation to that fact so far. My understanding of having an ASN means that the owner organization should at least have 2 independent upstream providers AND a connection to an IXP (which in my eyes is of course no replacement for IP transit) to increase their availability in the internet routing table.
I think with some business development it would also be beneficial to talk to the group of stubASN [14] which includes around 214 ASNs to increase their reachability in the global internet routing table by connecting themselves to the local IXP. Said that, less than 10% of the stubASNs are connected to an IXP. Looking at the upstream transit providers for e.g. ASNs in the finance, energy, government and education sector, this might be a good argument to join.

In this topic I see the IDA also as a 'shareholder for the government' when it comes to the term 'critical infrastructure'. *This document covers only normal operation of the internet and does not cover the area of cybersecurity.* But when it comes to a crisis, there are already concepts/systems in place, to build a basis for Cybersecurity very quickly. My reference for this goes to FENIX [15], which is a 'invisible IXP' when a whole region/country is under heavy DDoS attack. Not sure if IDA has already similar ideas or concepts in place and hopefully they are not necessary at anytime soon.

Also the IDA-Goal of encourage the growth of data centres [16] is not reflected in this document, because I think that an independent IXP should never rely on a single datacenter. Instead of creating local/national standards [17], it should make use of practical Open Standards like ones provided by Open-IX [11].

Another thing which I realized looking at the current IP transit and peering landscape in Singapore is, that many ASNs are not aware of PeeringDB [6] and it's usage for ISPs, Networks and of course datacenters. So I included the latest overview of PeeringDB 2.0 which is illustrated in the picture below:



Key Questions

If IDA wants to be open for what really happens out there in the IP Transit and Peering Landscape in Singapore, then it might be useful to work on the following questions.

General: How could IDA create the “best internet” for everybody in Singapore?

IDA uses it's resources to support the industry with the 4 simple objectives/benefits which are in the interest of every Internet-user here in Singapore, this will ensure growth and sustainability.

General: What would be the common objectives/benefits to achieve the “best internets” for everyone?

If IDA decides to support and guide the development of the Singapore's internet landscape, let's say: to build “the best internets”. This requires every single ASN within Singapore (no matter if it's ISPs, ICPs/CDNs or IXPs, no exception or discrimination) to work on the simple 4 goals:

1. **Low Latency:** Noticeable increase in performance for end users
2. **Local traffic exchange:** Increase the peak traffic at IXPs, saving in national and international transit over XYZ million S$ per year in Singapore
3. **Content:** Akamai (15-30% of internet traffic), Cloudflare, Limelight, Google and other CDNs need to be present at the local IXPs
4. **E-Government:** Social benefits from e-government access to IXPs
5. **Other benefits:** Further economic benefits resulting from IXPs and the SGIX-FactSheet [16]

Transit market: How can the Situation between the Big3ASN and the other localASN be resolved or relaxed?

IDA should organize a “internet landscape round-table” with the respective stakeholders (the only requirement: participant needs to represent his own ASN) and discuss how to work on the above 4 goals (if you agree with them in general).

Key Actionpoints

Once the direction is clear, there are some key Actionpoints to be addressed and executed, here are my ideas/suggestions:

How can IDA support expanding the local IXP?

1. Bring the SGIX to Equinix in the year 2015: If you support this, talk to me, I will help! With this step and additional business development with the available ASNs at Equinix you should be able to push the amount of members far behind 100 to 150 ASNs.
2. Enable the “Singapore Internet Community“ by sponsoring/engaging in close-related events:
    1. Singapore Networking: IDA could support **SGNOG [9]** via SGIX, they are volunteers doing a big effort for the Singapore Network Operators Group (SGNOG), their events start on the 18th of August 2015.
    2. Asian Networking: Get Equinix to Host the **Asian Peering Forum [7]** (APF2016) in Singapore, then you have the Asian Peering Community in town. This year it will be held in Bangkok (September 2015). Hosting such an event in Singapore will bring the decision makers into your country.
    3. Asian Networking: Bring **APRICOT [8]** to Singapore (APRICOT2017, 2016 is already planned to be in NZ), then you have the ISPs and CDNs in town. Don't forget the guys from **APIX**, this is the new community for IXPs within Asian region (sister organisation to Euro-IX). Hosting such an event in Singapore will bring the decision makers into your country.
    4. **“Internet Landscape Roundtable”**: Address the Big3ASN vs. localASN with the responsible parties and elaborate on a consensus. If you need help, I will help.
3. Enable Longterm Community Support:
    1. Recruit a **Community Manager**: Appoint someone at IDA to actively support SGIX who is responsible for the ISPs, CDNs and IXPs community. Let this person do social networking. That way IDA is better connected to the market and can show it's support directly to the Community.
4. Enable (plan, build, run) **Social Media activity** on various platforms, create a Social Media Strategy:
    1. Create a Twitter account for the Singapore Internet, do pro-active communication, participate in the community.
    2. Create a Singapore Internet Group at LinkedIn.
    3. Create a Singapore Internet Group on Facebook.

OK. I could add another 4 to 6 pages with suggestions, hope that this helps anyway.

State of the interest / Personal motivation

I'm Marco Huggenberger (37 years old, Swiss citizen) and I'm in Singapore since 3 months. I'm currently looking again for a new challenge/job in the IT/telecoms sector.

For the published document: "*Consultation on Singapore's Internet Protocol Transit and Peering Landscape*" I wanna provide you my personal, independent viewpoint on the technical and economical side, I will not provide any political statements.

I hope, that my feedback will bring at least some positive aspects. For me, this situation is quite unique.

Said that, I'm a very open minded person and like to share my thoughts and opinion, even I'm aware that this might be in conflict with the local culture which I'm trying to adapt quickly. So please forgive me, if my document 'steps on someones shoes'.

I also wanna state, that I'm currently not associated with any company or interest group here in Singapore, except that I'm a Internet-user. Therefore my views are my own believes and if something is unclear, help yourself to contact me over the provided details on the frontpage.

Of course I had already conversations with different local and international companies about Singapore's IP Transit and Peering Landscape. To avoid any conflicts within the Singapore Internet Community I will not include any of these views here. On the other hand I also learned, that some participants are already a little bit overstrained or tired to comment on this IDA document. I still hope that I'm not the only person who respond to the IDA document :)

Comments & Conclusions

The points which are referenced in the following section are all referenced to the original document from the IDA: “Consultation on Singapore’s Internet Protocol Transit and Peering Landscape”.

Comments (before 24ff., official section)

1. IXP is missing

Please add the role of the IXPs to the concept, this is quite important for the peering landscape in Singapore, unless you only wanna show the transit landscape.

3./6. Transit + Peering Ecosystem

It should be highlited, that the dominant/official 3 ISPs of Singapore (Singtel, Starhub and M1) have a selective peering policy and this makes it simply impossible to have a peering with any of them. Therefore I will call them big3ASNs [12]. The other non-dominant ASNs will be referenced with the term localASN [13]. If I understand the market well enough, there is no localASN who has a peering with one of the big3ASNs (which makes them so dominant).
Of course IDA cannot dictate a companys/ASN peering policy, but seeing this as a common practice out there in the market (I've also seen this in Europe and specifically in Switzerland) it's usefull to hightlight this 'little detail'. Selling transit to all the localASN is a big business for them and of course I can't sell anything to a localASN if you peer with them. Kind of a 'chicken and egg' problem.
But specially because of the dominance (in the view of the Singapore Internet Residential Market) of the big3ASNs, it might be good for the Singapore Economy that the doors are not completely closed for peering.

8. Study's View

Not sure if I'm correct, but I see no reference to non-Operators groups or statements from neutral Organisations like ISOC [2] or Open-IX [11]. I also find that in the age of internet, referencing to a study of 2013 (which is more than 2 years) is a waste of time.

11. big3ASN vs. localASNs

I already stated the difference between big3ASN and localASN, to see that there is discrimination going on in 'this market', I'll put four quotes to this item (I'm sure you heared them before):

1. “Transit is Cheaper than Peering” for all non-localASNs
2. “Transit is the only Option”, for localASNs it's impossible to peer with the big3ASNs. The non-localASNs give you their peering, it's also possible that these non-localASNs do not peer with localASNs in their foreign country
3. The bigCDNs [10] have enough power to install their systems within the big3ASNs, which gives them again more relevance in the market if the bigCDN [10] has not deployed their systems on an IXP within Singapore.
4. Some non-localASNs have so much capacity, that they will send their traffic over the Upstream ISPs of the big3ASNs until they are peering directly with them.

13. Conclusion

I strongly disagree:
a) There is no way in not discriminating the Tier 3 ISPs, respectively localASNs by the big3ASN
b) If you give them only the commercial choice, they will always do Transit, money rules the world.
c) the 5 USD/Mbps (2013) is today at 2 USD/Mbps and it will go further down to as low as 50 cents/Mbps within the next 5 years (or faster). But of course I cannot predict the future.
d) not true, big3ASN vs. localASN context

15. Development

I see a “healthy development” but certainly a “unhealthy status”. I think if you just say everything is OK, then there will be many issues in the future and probably they will all come at the same time. So my advise on this topic will be to be pro-active to the current issues and try to make the best out of it.

16. Status Quo

Confirms the big3ASNs vs. localASN discrimination.

17. Consumer view

Here you take the view of the consumer, but if you think of security for the government, it might be better for the IDA to make everyone understand that local-traffic should stay local and should even not as a plan-b, leave the country because it might be intercepted by third-party or whatever other imaginable situation.

18. Actionpoints

I think IDA should do some efforts which I listed in the Key Questions/Actionpoints (P5)

19. Primary goal

Not strong basis because the points which I listed in the the Key Questions/Actionpoints are not yet your goals :)

20. Market failure happens

Study did not find evidence of market failure, does not mean that it does not exist or already happened. The thing is, when it happens, then it's already to late.

22. Peering Ratio

Study says 50%, but look at major european IXPs like DE-CIX or AMS-IX, they have currently ratios over 80%. I'm sure with the right “Community and/or Business Development Manager” it would be an easy goal to add another 100-150 ASNs to the local IXP.

Comments (24ff.)

24a.

Why Peering Sucks [1] says a lot about the market in Asia, of course Singapore market is leading, but I think sitting there and not doing any efforts will just push you beyond the leaders in future rankings.

24b.

As I already mentioned for the localASN [13] transit is the only option for them, the big3ASNs [12] are to dominant and might hinder innovation.

24c.

My theory: Peerings in Singapore only exist between big3ASNs and bigCDNs [10], but to be precise not between big3ASNs and localASNs, there you only see Transit. This is called the “Law of Increasing Poverty” by Karl Marx, for Singapore this means that the big3ASN will always have more traffic exchanged for a lower price (sometimes free and if localASN, than it's payed extra) and the localASNs have less traffic exchanged for a higher pricing (the exchanged traffic with big3ASNs needs to be payed).
Also if you are a localASN [13] and do transit for stubASNs [14] most likely they will end up having loads of traffic to for example Akamai (which claims to be responsible of 15-30% of the internet traffic). So because of the large-scale Infrastructure of big3ASNs [12] they will of course have a lot of bigCDNs within their own ASN and then the local traffic is not served anymore by the bigCDNs (let's assume the localASN has no IXP connection) rather than by the big3ASNs infrastructure over their IP Transit services.

24d.

Evolution, or better: fall of IP Transit pricing (worldwide trend). 10 Years ago, the prices where between 50 and 100 USD / Mbps. And now you can get IP Transit for as low as 0.5 USD / Mbps (with a comitment of at least 1 Gbps) in the US or within Europe. This trend will continue and the average prices will shrink anyway as soon as there is more capacity on the market as necessary.

24e.

I already gave my points with Key Questions and Key Actionpoints.

24f.

I think if you try to answer the Key Questions and do the Key Actionpoints will people make understand the industry better and shows that IDA is ahead of what already is in place since a long-time.

Conclusions

To be honest, I'm impressed, that the IDA is sharing it's viewpoint and gives interested parties the possibility to show their comments and conclusions. Well, I hope that at least some points in this document are useful for the IDA and support the idea of an internet for everyone and put into action sometime soon.

I would be pleased if you could take all the feedback from the community and use it the way you want it.
At the end of the day, at least in with my understanding, IDA should support the natural growth and sustainability of the Internet and it's connected parties by enabling them to use the right technology and standards and of course facilitate as a 'connecting' (Community building) element. If there is any need for direct communication and problem solving within Singapore.

For me this was a good opportunity to show and refresh of some of my past experience, if you like the ideas and would like to work together with me, use the contact details on the front-page.

Thank you for your attention.

Kind regards

Marco Huggenberger

Appendix

Reference	Document Title	Company	URL
1	Why peering in Asia sucks	Limelight	http://www.slideshare.net/
2	Unleashing the Potential of the ASEAN Economies	ISOC	http://www.internetsociety.org/
3	Global Information Technology Report 2014	World Economic Forum	http://reports.weforum.org/
4	Internet users (per 100 People)	WorldBank Group	http://data.worldbank.org/indicator/IT.NET.USER.P2
5	EuroIX	Volunteers	https://www.euro-ix.net/
6	PeeringDB	Volunteers	http://www.peeringdb.com/
7	APF	Equinix	http://www.peeringforum.asia/
8	APRICOT/APIX	Volunteers	http://www.apricot.net/
9	SGNOG	Volunteers	http://www.sgnog.sg
10	BigCDN		This group is represented by (not exclusive): Google, Akamai, CloudFlare, Limelight, Amazon, Microsoft
11	OPEN-IX	Volunteers	http://www.open-ix.org/
12	Big3ASN		Namely SingTel, Starhub and M1, their overall **exclusive** market share in the IP transit business is below 20% (measured by the amount of present ASNs in the internet routing table). That means only one or more Big3ASN is offering their IP Transit service to these localASNs.
13	localASN		All regional ASNs including the Big3ASN, and all their Sub-ASNs. As of today there are 277 ASNs operating in Singapore. But less than ¼ of these ASNs are connected to the SGIX. But more than 1/3 of these ASNs have only a Single upstream (Singlehomed).
14	stubASN		Out of the 277 localASN there are more than ¾ (or say 214) which are not doing transit and therefore I call them stubASN. This implies that ¼ of the Singaporean ASNs are doing IP transit with other ASNs.
15	FENIX		http://fe.nix.cz/en/
Continued...			

16	SGIX-FactSheet		http://www.ida.gov.sg/~/media/Files/Archive/Infrastructure/Infrastructure_Level2/20090708173942/SGIX_FactSheet.pdf and also: http://www.ida.gov.sg/Infocomm-Landscape/Infrastructure/Singapore-Internet-Exchange
17	Green Data Centre Standard		http://www.ida.gov.sg/Collaboration-and-Initiatives/Initiatives/Store/Green-Data-Centre-Standard