HURRICANE ELECTRIC
INTERNET SERVICES

Vardah and routing aftermath

Sep 2017 – APNIC 44
Taichung, Taiwan

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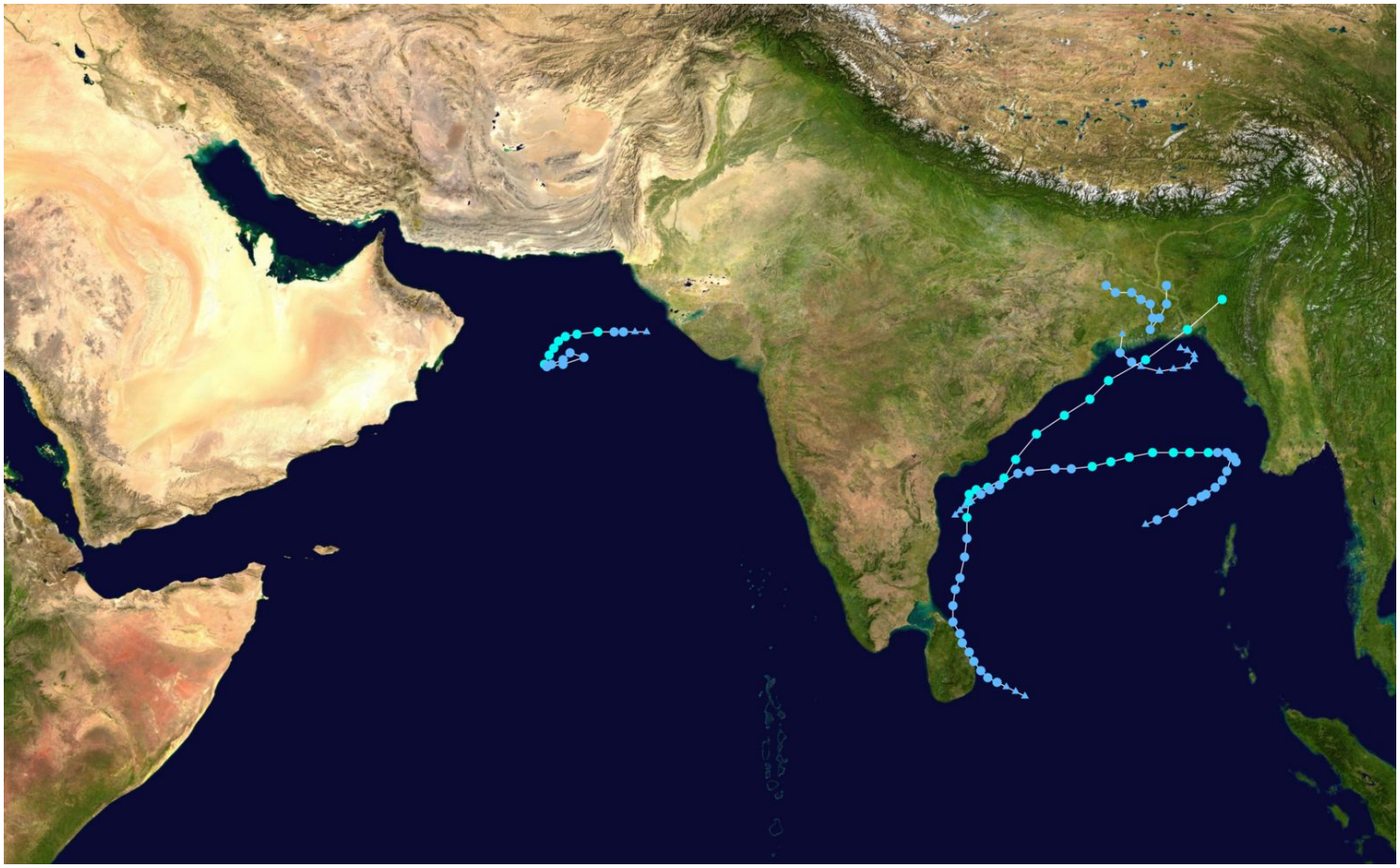
Vardah Cyclone - Dec 2016



What is Vardah?

- A major cyclone impacting South Asia including India, Sri Lanka, Bangladesh, etc
- During peak, winds were at 130 km/h (80.7 mile/hr)
- 400 people lost life along with damage worth $3.98 billion

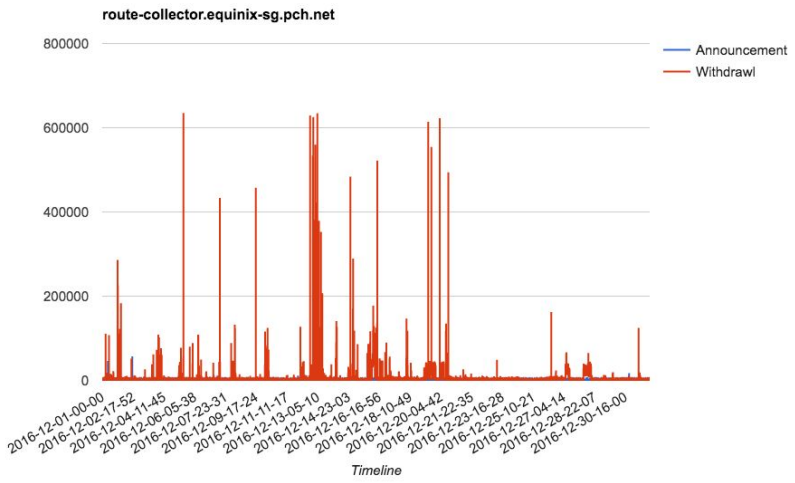
Impact on Internet

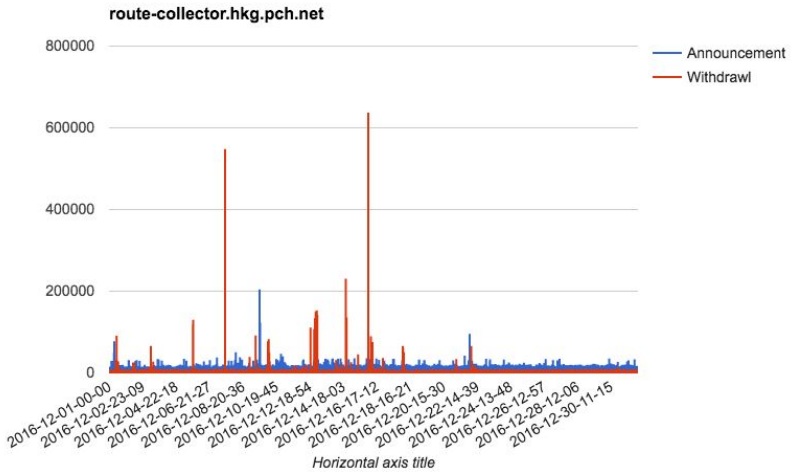
- Damage on ground level infrastructure (mostly on overhead fiber)
- Outage on Bharti Airtel i2i submarine cable between Chennai & Singapore
- Known impact on one of large content network which peers in India resulting in major choking on most of networks

Possible to analyse routing noise?

- Not doable at large scale if looking at route announcement on far collectors like Oregon Routeviews or RIPE RIS.
- PCH route collector at major exchanges is only known project which openly publishes collector data
- PCH publishes mrt dumps for updates but “sh ip bgp” text dumps for table making it tricky to parse them & analyse
- Hard to analyse impact on ground infra since most of impact was on last mile which is not visible in routing tables

Announcements & withdrawals in Dec 2016



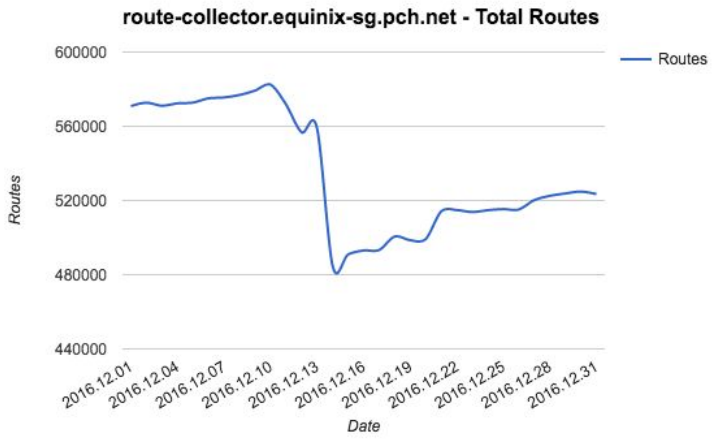


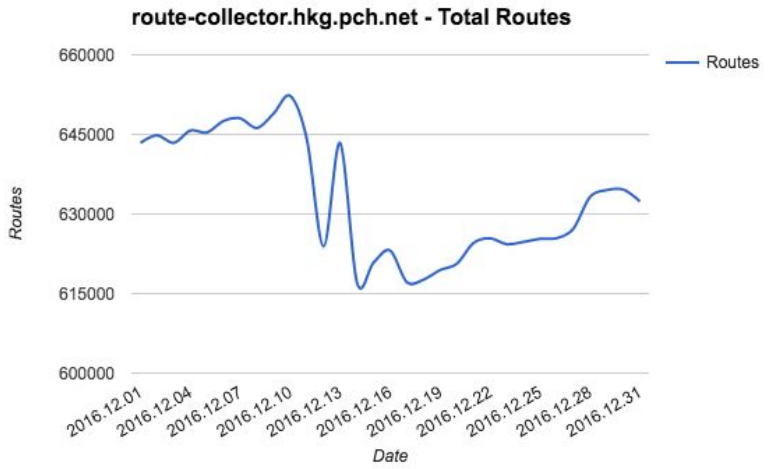
Analysing data

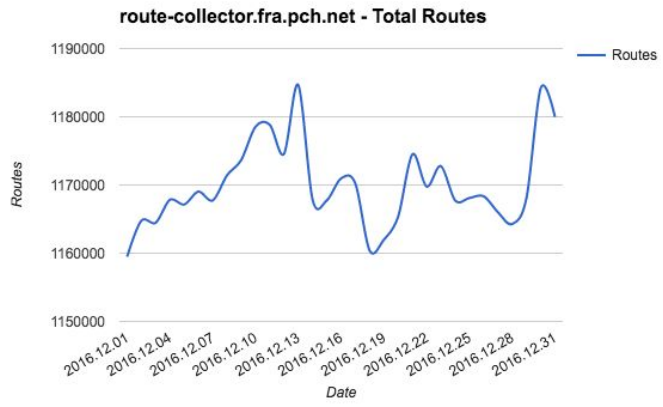
- There were huge withdrawals visible at Equinix Singapore as well as HKIX
- Per min update dumps were analyses, resulting in a total of 44641 dumps per IX
- Total routes visible* at Equinix Singapore, HKIX, AMS-IX and DEC-IX were mapped
- Further mapping of each peer* to announcement is done to graph the announcements

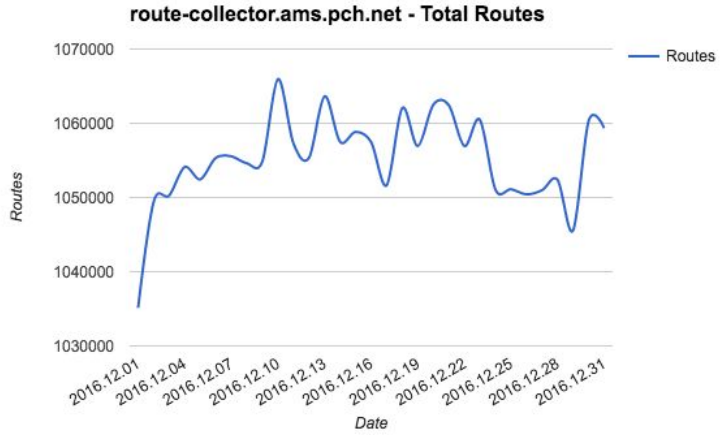
(visible to PCH collector)*

Total routes at IX’es in Dec 2016



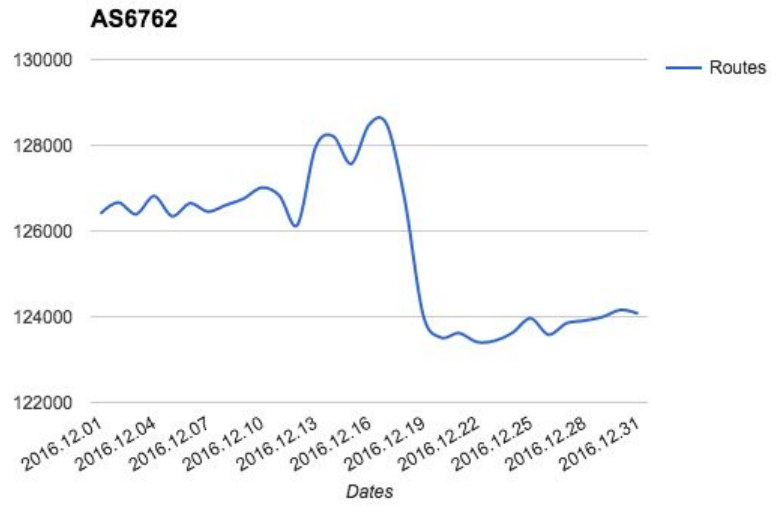


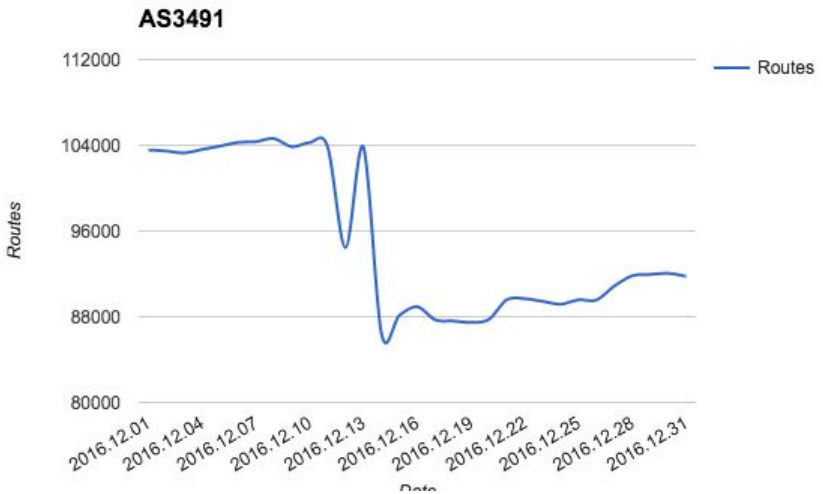


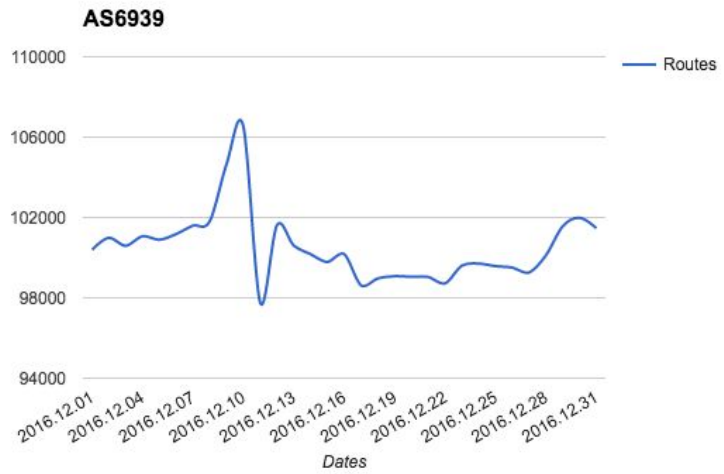


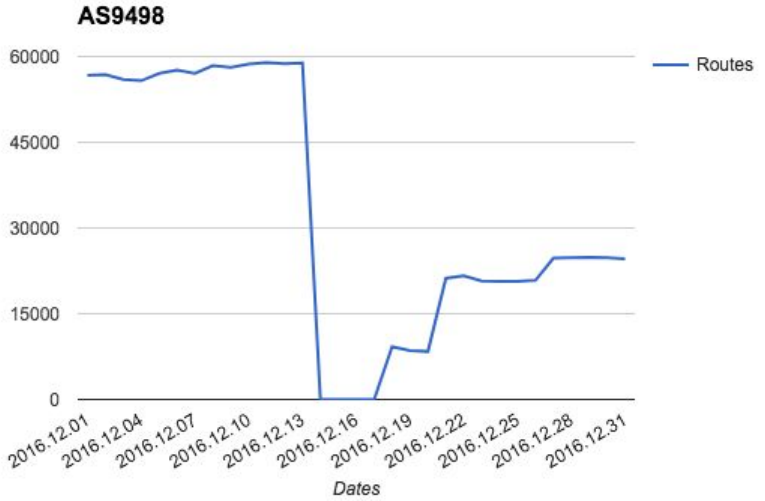
A closer look at Equinix Singapore peering fabric...

Route announcement by top ASNs









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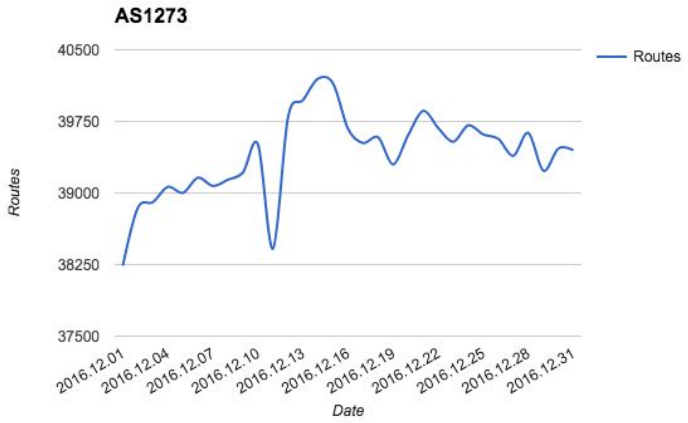
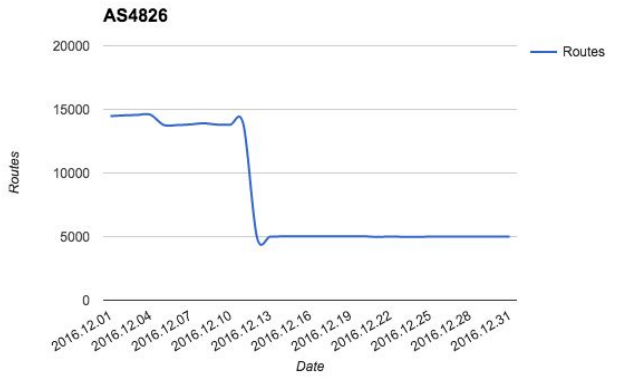
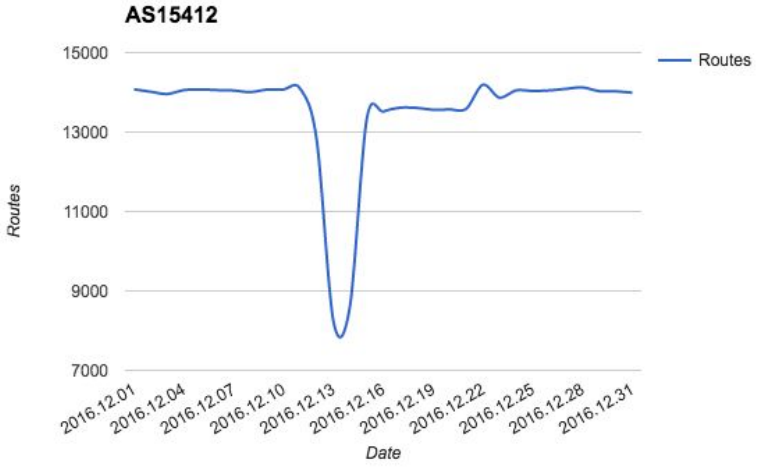
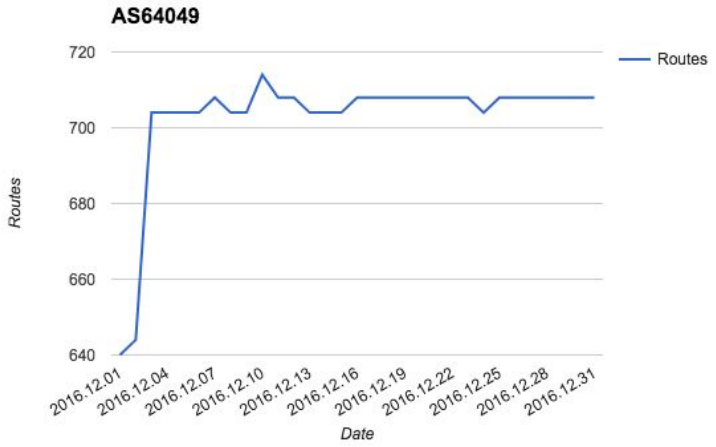






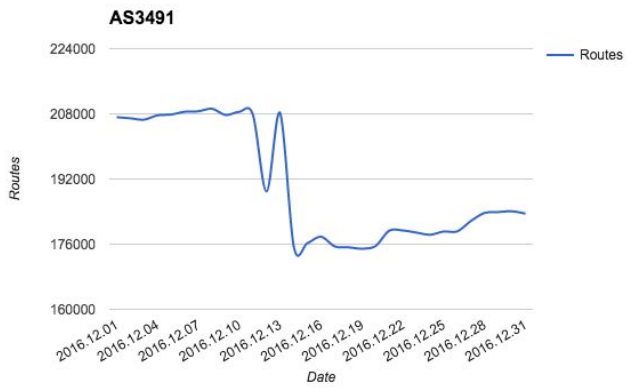


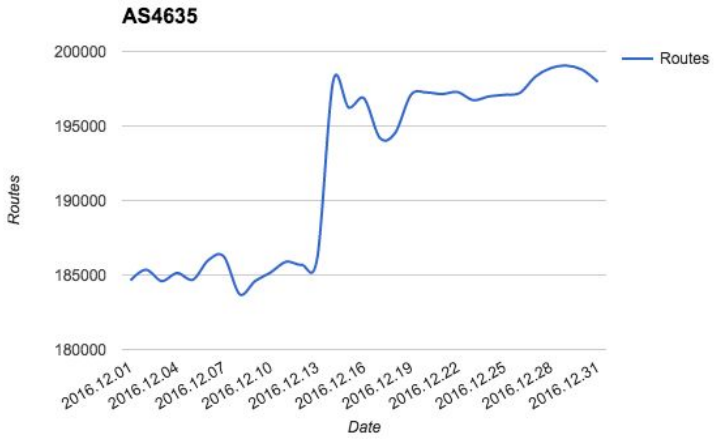
A closer look at Equinix Singapore

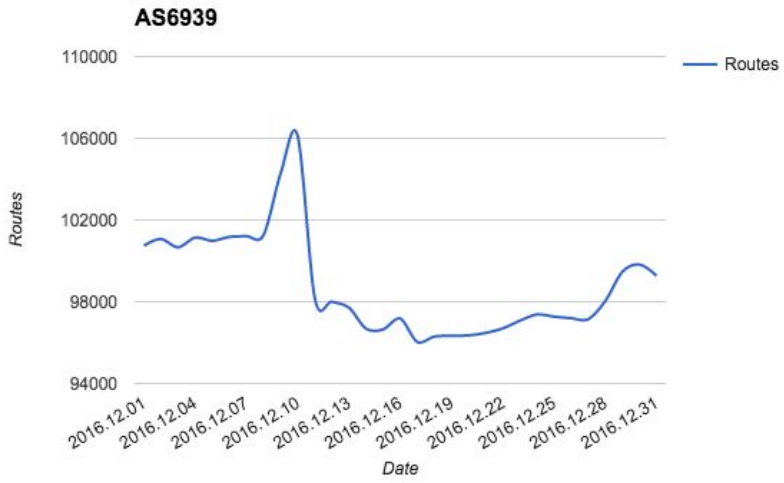
- 196 peering ASNs visible at the IX in Dec 2016
- Major ASNs who pulled announcements: AS6762, AS3491, AS6939, AS9498 & AS4826
- From India AS9498 seem to have zero announcement for couple of days
- Other large operators from India AS15412 & AS64049 seem to have lesser impact based on their announcements

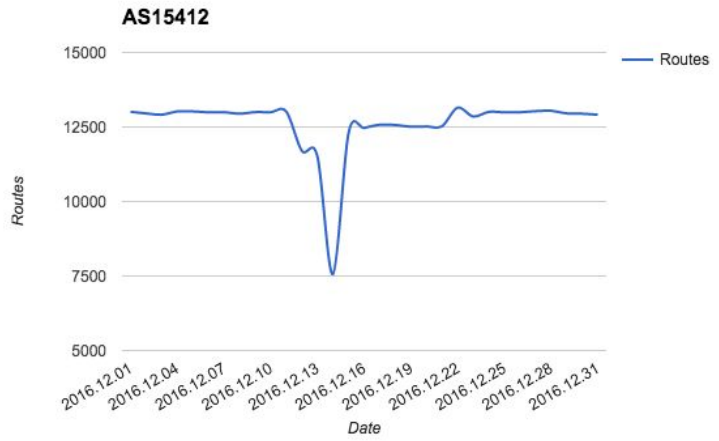
A closer look at HKIX Hong Kong peering fabric...

Route announcement by top ASNs







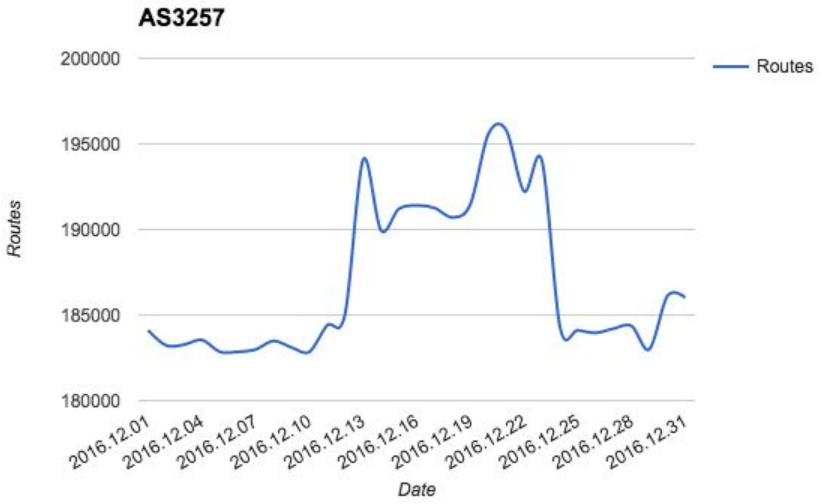


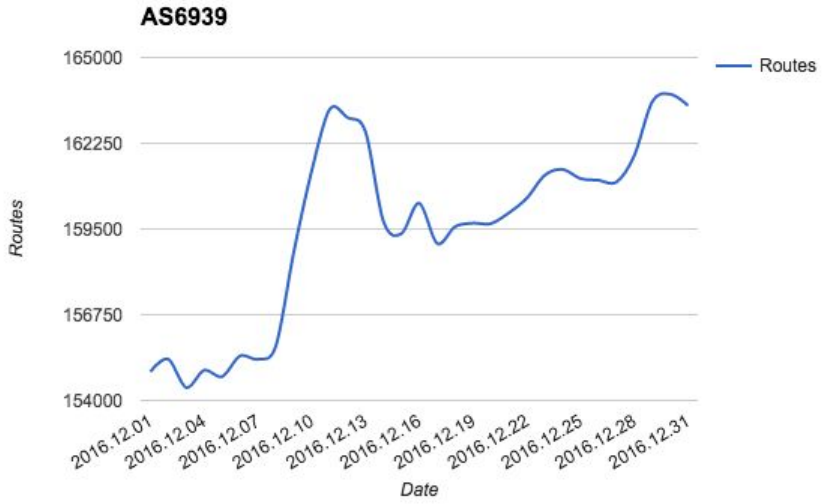
A closer look at HKIX Hong Kong

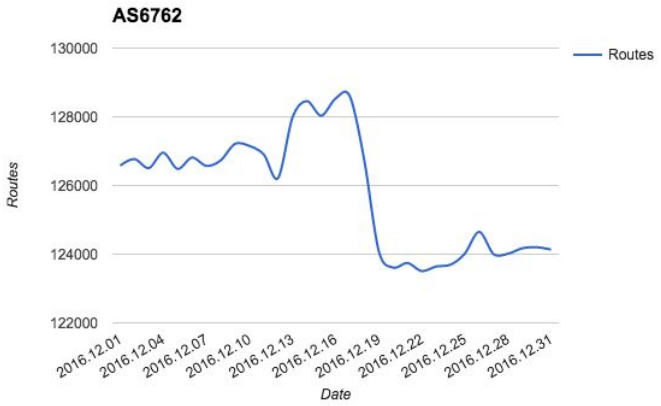
- 84 peering ASNs visible at the IX in Dec 2016
- Top 10 ASNs in terms of route announcement: Common ASNs who reduced announcement at Equinix Singapore showed similar pattern at Hong Kong
- While announcements reduced for many, there was a jump in announcements from AS4635 (HKIX Route Server)

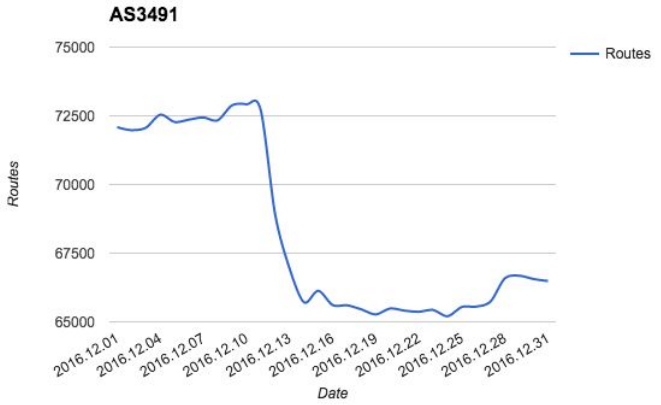
But where did the Asian routes go?

DECIX Frankfurt routes

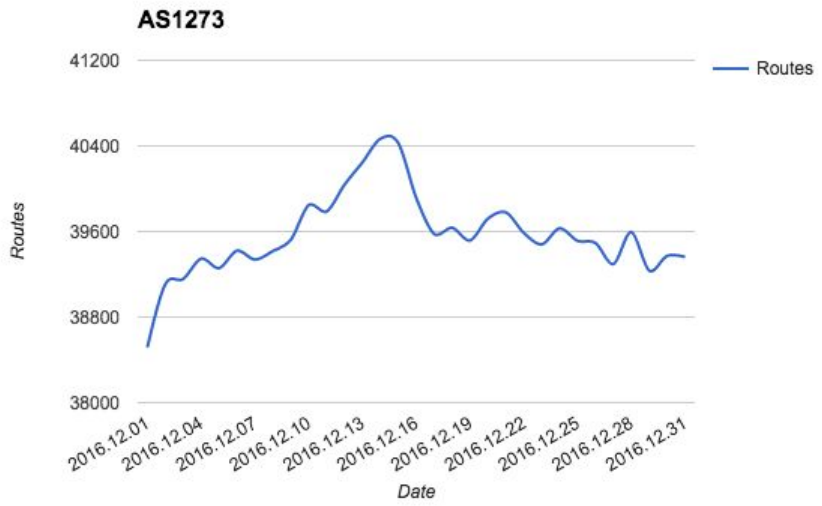


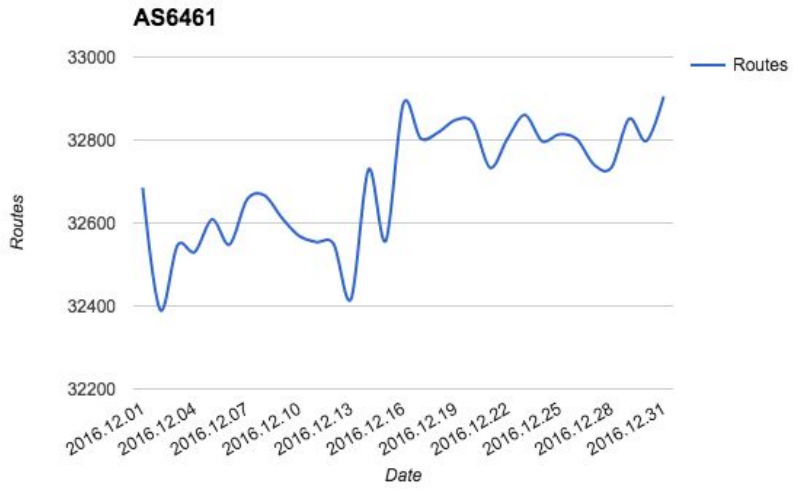




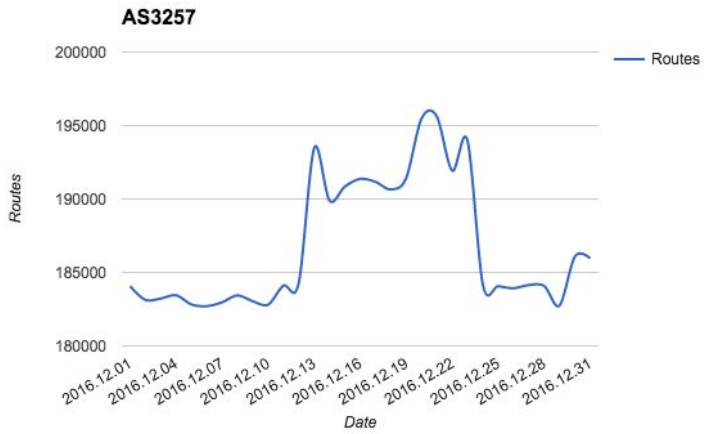


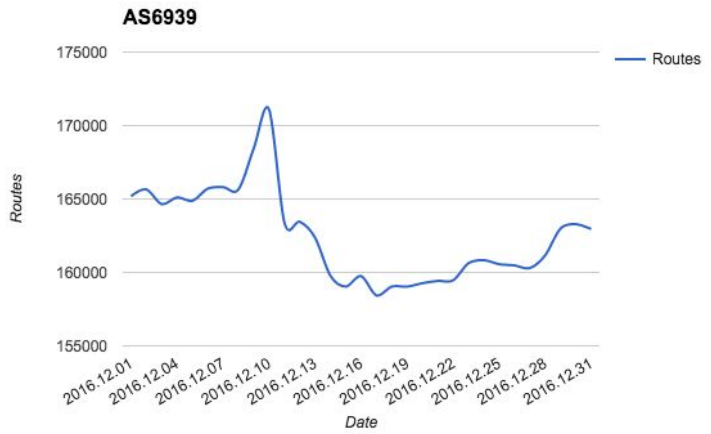
DECIX Frankfurt routes (cont.)

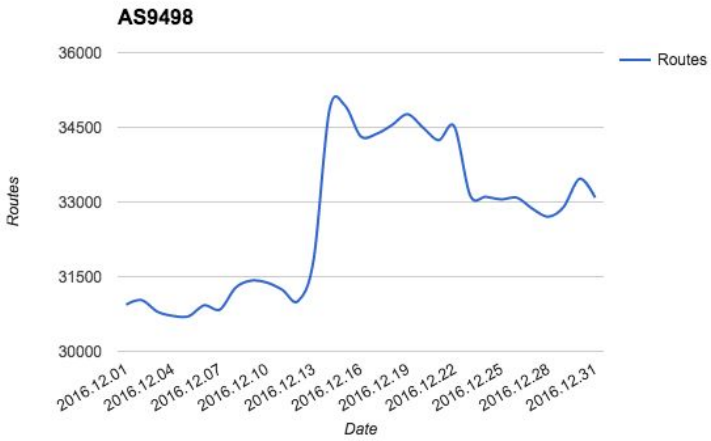


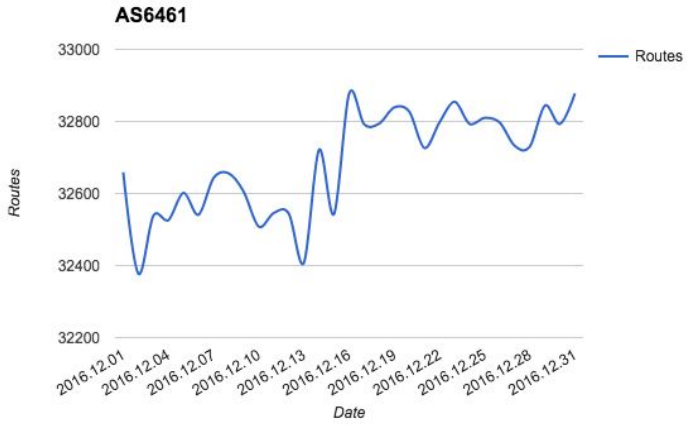


AMS-IX - Amsterdam Routes









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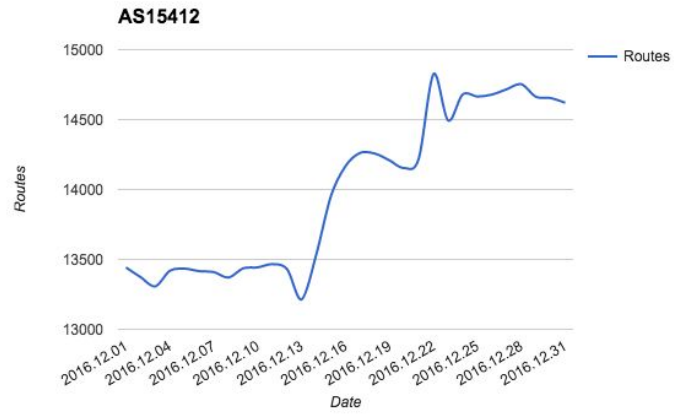

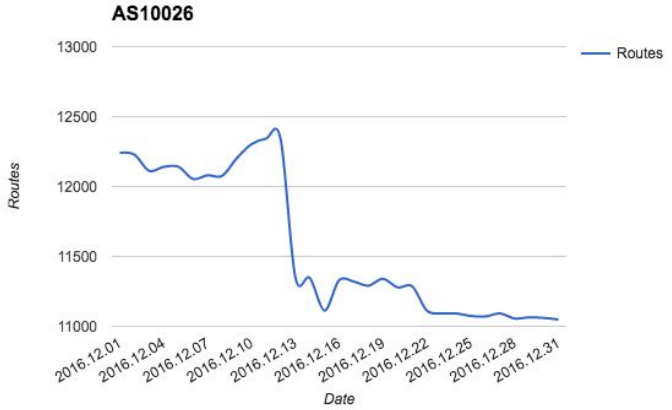

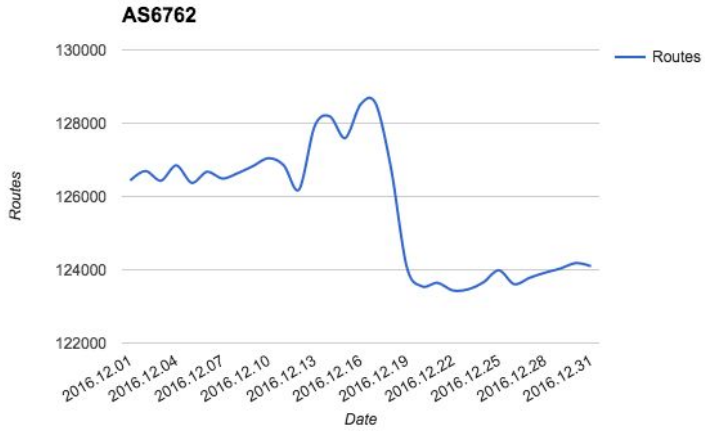

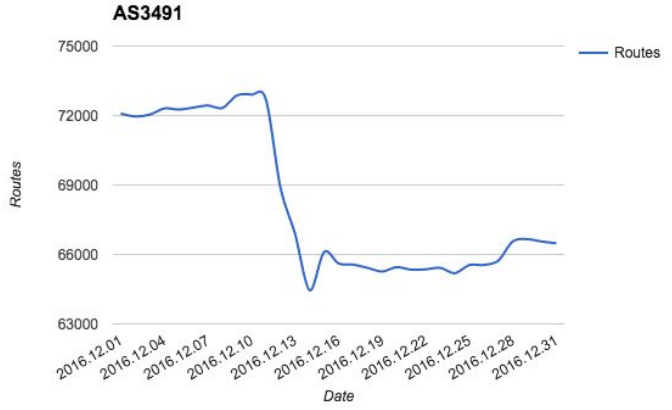

Conclusion

- Cyclone & other natural disasters do show their impact on BGP tables as the physical infrastructure breaks & network operators re-route their traffic
- Operators in South Asia typically try to reach East via West or vice-versa during cable outages
- Networks in Europe received more prefixes as Asian networks in Asia tried to re-route traffic
- Asian networks with PoPs in Europe saw a significant reduction in number of routes at Europe

Misc Points

- Data is based on BGP table learnt by PCH route collector (AS3856). What is visible is there but there can be more which isn't visible due to missing peering!
- Jumps were due to new more specific announcements as well as non-best paths turning into best paths
- PCH PoPs in India & Bangladesh because respective IX have mostly local peers showing almost no impact

References

- PCH Routing Data - https://www.pch.net/resources/Routing_Data
- Vardah damages undersea cable, internet slows down - http://timesofindia.indiatimes.com/india/Vardah-damages-undersea-cable-internet-slows-down/articleshow/55967405.cms
- bgpdump tool - http://ris.ripe.net/source/bgpdump

Thanks!

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