



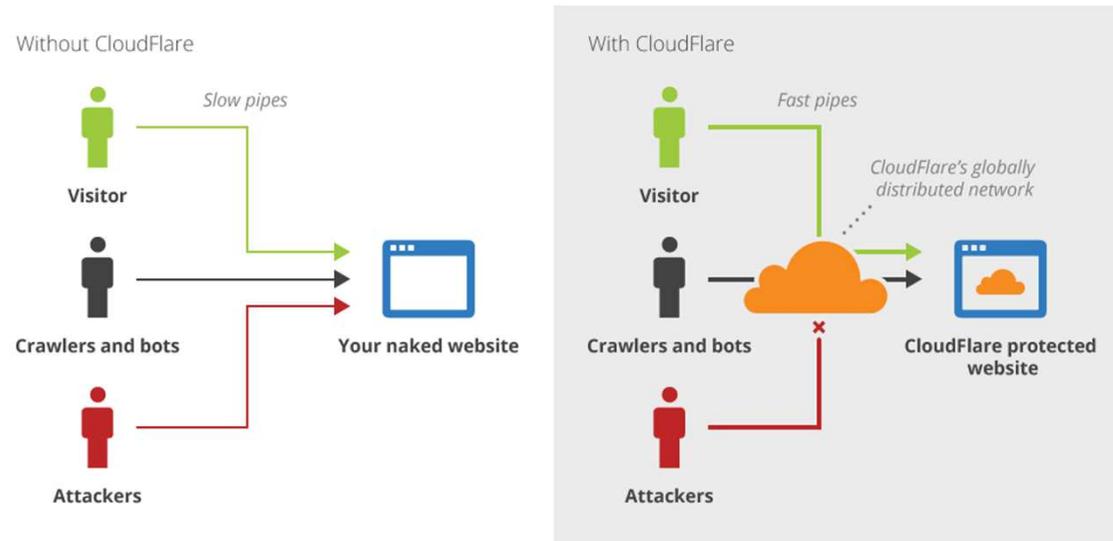
Interconnection Landscape in Asia

Taiwan Peering Forum 2017
Tom Paseka

What is Cloudflare?

Cloudflare makes websites faster and safer using our globally distributed network to deliver essential services to any website

- Performance
- Content
- Optimisation
- Security
- 3rd party services
- Analytics



Some numbers...

- 100+ PoPs
- 50+ countries
- 150+ Internet exchanges

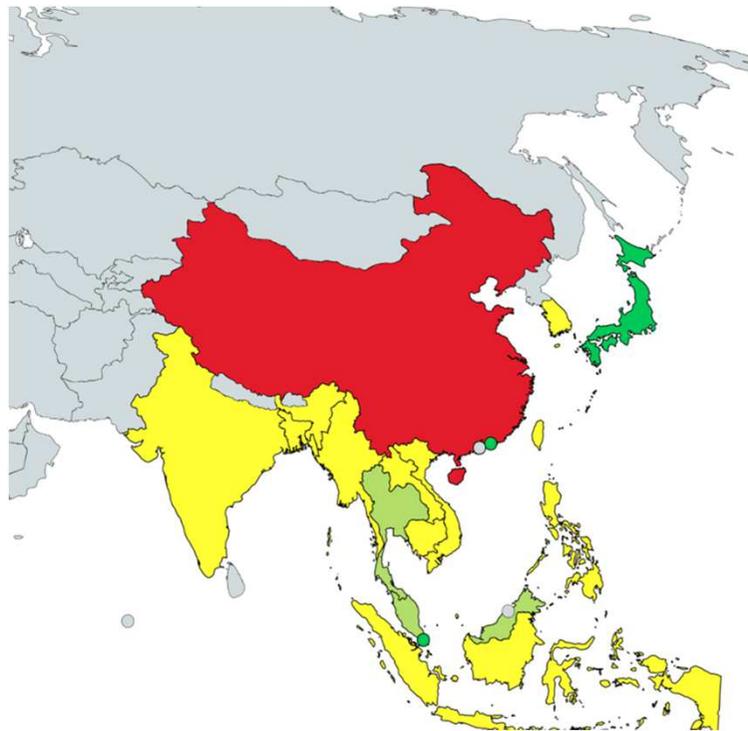
...we know a little about interconnection

Interconnection

Interconnection. Interconnection is the linking of two networks for the mutual exchange of traffic.

- As defined from US Code of Federal Regulations (CFR)
- Peering? Transit? IX?
- What's regulated?

Interconnection ecosystem



Interconnection - peering ecosystem

- Hong Kong, Singapore and Tokyo (Japan) have strong interconnection ecosystems.
 - Hong Kong maintains ubiquitous access the whole market, a great interconnection point for the region.
 - Singapore's largest ISPs maintain a more restrictive policy, but South East Asian economies hub through Singapore.
 - Japan largely open except for the largest ISPs, fragmented market. Emerging interconnection points - Osaka.
- South Korea and Taiwan have a small ecosystem, supported by internet exchange points, but hindered by the dominance of largest players and regulation.

Interconnection - major networks

Major regional networks:

- Tata
- NTT
- Telstra

Other strong Regional networks:

- PCCW
- Global Cloud Exchange

Many country specific networks which are strong: Hinet, Singtel, KT, China Telecom, China Unicom etc.



Interconnection - major networks

Many of these networks don't connect with each other in region, or do so poorly.

Large interconnection fees result in limited capacity and poor user experience.

It's not uncommon for carriers or ISPs to send traffic via the USA as the interconnection is cheaper, including submarine costs, than paying these dominant players.

Interconnection - peering

Hong Kong: HKIX, Equinix, AMS-IX Hong Kong

“Having a point of presence in Hong Kong without connecting to HKIX is like having dinner without a fork”

Singapore: Equinix SG, SGIX, BBIX.

Very strong south east and south asian presence

Interconnection - peering

Tokyo (and Osaka): BBIX, JPNAP, JPIX, Equinix

Each of the 3 major networks (Softbank, NTT, KDDI) own an internet exchange, leaving a fragmented market. Access to all is possible via all exchanges.

Malaysia: MyIX

Entire Malaysian Market connected! This is a FANTASTIC model to follow.

Interconnection - peering

Seoul: KINX

KINX is leading in the country, however with only around 10% of eyeball traffic attached, as the three major players, SKBB, KT, and LGU+, have very restrictive policies and dominate interconnection legislation.

Taipei: TPIX, TWIX

TPIX is growing in presence, but similar to Korea, the majority of the country isn't connected. Thus hampering the development of the economy.

Interconnection - regulation

The markets with less regulation and an open interconnection market, such as Japan, Hong Kong and Singapore all have a strong market and some of the lowest interconnection pricing. Because of these open policies, these three countries see the strongest technology investment.

Transit pricing in South Korea and Taiwan can be as high as 16x higher than the former 3 markets.

Interconnection - regulation

South Korea has very restrictive policies protecting its largest three carriers and hindering competition and growth.

Taiwan has insufficient competition and poorly maintained interconnection regulation, leaving a super powerful incumbent and poor chance for competition. Regulated “peering” price at NTD349 (2016) is far higher than market rates for internet access. With Hong Kong 20ms away, is the price disparity worth it?

What can regulators do?

- Don't focus on pricing
 - Leave that to the market!
- Focus on what is anticompetitive behavior.
- Make sure policies support competition and growth.
- Remember, the strongest ecosystems exist with little legislation, but a good framework for competition.

What can Internet Exchange Points do?

- Be transparent with your pricing:
 - Publically displayed price list.
 - No discriminatory pricing.
- Encourage local meetings.
 - Local meetings help the market grow.
 - Provides support and training.
 - Fosters industry growth through training and education.
 - Helps the local Internet Exchange grow.
- Keep a simple design.
 - An IXP is a simple fabric, no need to over-build!
 - A simple but robust design, keeps the IX competitive.

What can Taiwan do?

- HiNet's market position is too large.
- It has the ability to use its market position to unfairly compete.
- High prices from HiNet create a barrier for entry for other players as well as new technology growth.
- The regulator needs to review, to ensure no anti-competitive behavior exists.

Summary

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An open market helps:

User Experience

Competition

Corporate Competitiveness

Innovation



Summary

Singapore, Hong Kong, Japan are great examples of this being a success.

Malaysia and Thailand are rapidly becoming great interconnection points.

Taiwan, South Korea are lagging behind these other economies because of restrictive policies. Both Economies have a high barrier for entry for new players.

More information

Some talks I've given previously:

- <https://www.slideshare.net/TomPaseka/routing-for-an-anycast-cdn>
- <https://www.slideshare.net/TomPaseka/kinx-peering-forum-a-brief-overview-of-regulation-of-interconnection>
- <https://www.slideshare.net/TomPaseka/interconnection-in-regional-markets-58691262>
- <https://www.slideshare.net/TomPaseka/bbix-asia-internet>
- https://conference.apnic.net/data/41/0-taiwan-peering-scene_1456084546.pdf (Thanks William)!

Questions?

