Internet Exchange Point (IXP)
What is an Internet Exchange Point (IXP) ?

Why ISPs participate in IXPs ?

Why IXPs are important ?

Malaysia Internet Exchange
What is an Internet Exchange Point (IXP)?

- Major providers connect their networks and exchange traffic
- High-speed network or ethernet switch
- Simple concept – a place where providers come together to exchange traffic
Conceptual Diagram of an IXP

MyIX
Malaysia Internet Exchange

Exchange Point Medium

ISP A Router
ISP B Router
ISP C Router
Consider a region with one ISP (A)
- They provide internet connectivity to their customers
- They have one or two international connections

Internet grows, another ISP (B) sets up in competition
- They provide internet connectivity to their customers
- They have one or two international connections

How does traffic from customer of ISP A get to customer of ISP B?
- Via the international connections
International bandwidth...
- Longer RTT, more hops
- Costs significantly more than domestic bandwidth
- Is congested with local traffic

Wastes money, harms performance
- Multiple service providers
- Each with Internet connectivity
- Is not cost effective
- Backhaul issue causes cost to both parties
Solution:
- Two competing ISPs peer (private) with each other

Result:
- Both save money
- Local traffic stays local
- Better network performance
- More international bandwidth for expensive international traffic
- Everyone is happy
Domestic Interconnection

Internet Exchange Point
Why Peer?
A third ISP enters the equation

- Becomes a significant player in the region
- Local and international traffic goes over their international connections

They agree to peer with the two other ISPs.

- To save money
- To keep local traffic local
- To improve network performance, QoS,...
Peering means that the three ISPs have a connection (circuit) between each other

- Works for three ISPs, but adding a fourth or a fifth means this does not scale

Solution:

- Internet Exchange Point (public peering)
Every participant require to have one connection.
  - From their premises or colocation to the IXP

Rather than N-1 connections to connect to the N-1 other ISPs
  - 5 ISPs have 4 connection to other ISPs
    → already expensive than the cost of the IXP connection
Solution

- Every ISP participates in the IXP
- Cost is minimal – one local circuit covers all domestic traffic
- International circuits are used for just international traffic & backing up domestic links in case the IXP fails

Result:

- Local traffic stays local
- QoS considerations for local traffic is not an issue
- RTTs are typically sub 10ms
- Customers enjoy the Internet experience
- Local Internet economy grows rapidly
Ethernet switch in the middle
SAVES MONEY!!!

- Traffic going overseas means transit charges paid to your upstream ISP
- Money stays in local economy
  - Used to provide better local infrastructure and services for customers
- Customers pay less for Internet access
  - Therefore more customers sign up
  - ISP has more customers, better business
VASTLY IMPROVES PERFORMANCE!!!

- Network RTTs between organisations in the local economy is measured in milliseconds, not seconds
- Packet loss becomes virtually non-existent
- Customers use the Internet for more products, services, and activities
History

- KLIX, MIX
- Run by single or two ISP
- Peering cost a lot $$ (something like US 250/mbps/month)
- MyIX established in December 15, 2006
- Funded by the government
- Support from Regulator
- Managed and operate by the industry players
Flow of Local Traffic without Internet Exchange

ISP A

ISP B

Downstream Customers

Downstream Customers
Local Internet Traffic Model (In the absence of MyIX)

Similar situations used to occur in Africa & Latin America and in much lesser developed countries

Source: SKMM/Binafikir
Flow of Local Traffic with Internet Exchange

ISP A

ISP B

MYIX

Downstream Customers

Downstream Customers
[root@centos6my ~]# ping 58.27.84.6
PING 58.27.84.6 (58.27.84.6) 56(84) bytes of data.
64 bytes from 58.27.84.6: icmp_seq=1 ttl=61 time=348 ms
64 bytes from 58.27.84.6: icmp_seq=2 ttl=61 time=352 ms
64 bytes from 58.27.84.6: icmp_seq=3 ttl=61 time=347 ms
64 bytes from 58.27.84.6: icmp_seq=4 ttl=61 time=347 ms
64 bytes from 58.27.84.6: icmp_seq=5 ttl=61 time=347 ms

5 packets transmitted, 5 received, 0% packet loss, time 4743ms
rtt min/avg/max/mdev = 347.241/348.607/352.320/2.033 ms
[root@centos6my ~]# ping 58.27.84.6
PING 58.27.84.6 (58.27.84.6) 56(84) bytes of data.
64 bytes from 58.27.84.6: icmp_seq=1 ttl=61 time=4.48 ms
64 bytes from 58.27.84.6: icmp_seq=2 ttl=61 time=4.50 ms
64 bytes from 58.27.84.6: icmp_seq=3 ttl=61 time=4.51 ms
64 bytes from 58.27.84.6: icmp_seq=4 ttl=61 time=4.46 ms
64 bytes from 58.27.84.6: icmp_seq=5 ttl=61 time=4.55 ms
5 packets transmitted, 5 received, 0% packet loss, time 4033ms
rtt min/avg/max/mdev = 4.469/4.504/4.553/0.051 ms
[root@centos6my ~]# traceroute 58.27.84.6
traceroute to 58.27.84.6 (58.27.84.6), 30 hops max, 60 byte packets
1 103.246.89.1 (103.246.89.1)  0.248 ms  0.105 ms  0.176 ms
2 103.246.88.26 (103.246.88.26)  6.993 ms  6.871 ms  6.845 ms
3 218.30.63.45 (218.30.63.45)  7.082 ms  6.935 ms  6.906 ms
4 59.43.246.186 (59.43.246.186)  7.072 ms  6.953 ms  6.921 ms
5 59.43.248.201 (59.43.248.201)  153.635 ms  153.533 ms  153.569 ms
6 59.43.246.250 (59.43.246.250)  367.270 ms  367.245 ms  367.209 ms
7  ldn-tch-i1-link.telia.net (213.248.102.241)  366.744 ms  367.012 ms  366.966 ms
8  ldn-tch-i2-link.telia.net (80.91.250.218)  366.976 ms  366.948 ms  366.828 ms
9  ldn-b3-link.telia.net (80.91.250.213)  367.414 ms  367.351 ms  367.375 ms
10 xe-5-2-0.lon20.ip4.tinet.net (213.200.78.237)  367.485 ms  367.356 ms  367.410 ms
11 xe-4-3-0.lon25.ip4.tinet.net (89.149.186.45)  367.485 ms  xe-3-3-0.lon25.ip4.tinet.net
    (89.149.183.30)  366.660 ms  366.717 ms
12 telekom-malaysia-gw.ip4.tinet.net (77.67.75.150)  414.909 ms  414.795 ms  414.887 ms
13 10.55.200.13 (10.55.200.13)  441.640 ms  441.819 ms  441.686 ms
14  *  **  *
15 10.55.36.118 (10.55.36.118)  347.561 ms  347.540 ms  10.55.32.72 (10.55.32.72)  347.921 ms
16 58.27.84.6 (58.27.84.6)  348.126 ms  348.002 ms  347.965 ms
[root@centos6my ~]#
[root@centos6my ~]# traceroute 58.27.84.6
traceroute to 58.27.84.6 (58.27.84.6), 30 hops max, 60 byte packets
1 103.246.89.1 (103.246.89.1) 0.227 ms 0.172 ms 0.173 ms
2 58.27.105.165 (58.27.105.165) 1.823 ms 1.820 ms 1.838 ms
3 10.55.32.74 (10.55.32.74) 4.019 ms 3.898 ms 3.870 ms
4 58.27.84.6 (58.27.84.6) 4.672 ms 4.648 ms 4.642 ms
[root@centos6my ~]#
MyIX
Malaysia Internet Exchange

Central Nodes

1st Floor, Menara Aik Hua,
Cangkat Raja Chulan,
50200 Kuala Lumpur

CSF1 / CBJ 5
CyberJaya

10 Gbps Ring

Ground Floor Telco Room, Bangunan INTAC Technology Park Malaysia, Bukit Jalil
57000 Kuala Lumpur
Telekom Malaysia Bhd
Celcom Axiata Bhd
Pacific Link Telecom
Webvision
Mudah.my
Extreme Broadband

AIMS Data Centre Sdn Bhd
DiGi Telecommunications Sdn Bhd
TT dotCom Sdn Bhd
REDtone CNX Broadband Sdn Bhd
Extreme Broadband Sdn Bhd
Free Net Business Solutions Sdn Bhd
Mudah.my
VDSL Network Sdn Bhd
Gigabit Hosting
Packet One Networks (Malaysia) Sdn Bhd
Webvisions Network Services Sdn Bhd
Global Transit Communications Sdn Bhd
HostEmo Technology Sdn Bhd
Co-location Hosting
YTL Communications Sdn Bhd
Pacnet Internet (Malaysia) Sdn Bhd
IPS ServerOne Solutions Sdn Bhd
U Mobile Sdn Bhd
Macro Lynx Sdn Bhd
Net OnBoard Sdn Bhd
Techavenue Sdn Bhd
NTT MSC Sdn Bhd
V Telecoms Berhad
Piradius Sdn Bhd
MyKris Asia Sdn Bhd
Clear-Comm Sdn Bhd

JARING Communications Sdn Bhd
Maxis Broadband Sdn Bhd
Optical Communication Engineering Sdn Bhd
Extreme Broadband Sdn Bhd
IPS ServerOne

10 Gbps Ring
MyKris Penang

Level 2, Menara Suntech @ Penang Cybercity, Jalan Lintang Mayang Pasir, 11950 Penang

Level 7, Menara Ansar, 65 Jalan Trus, 80000 Johor Bahru, Johor

Ground Floor, ICT HUB Jalan Putra Square 4, Putra Square, 25200 Kuantan, Pahang.

100 Mbps

1 Gbps

1 Gbps

100 Mbps

Likas Square Commercial Centre 1 Lorong Likas Square Jalan Istiadat 88400 Kota Kinabalu, Sabah.

Lower Ground, Wisma SESCO, Jalan Bako, Petra Jaya 93673 Kuching, Sarawak.

100 Mbps

Regional Nodes

MyKris Penang

KKIPC

Sedco Communications
Growth Trends

Member

Max. Bandwidth

* As at 14th Jan 2012
Features of MyIX

- Redundancy
  - Redundant link, switches

- Dedicated Ethernet switch port
  (100/1000BaseT, 1GE and 10GE)

- Support
  - NOC to provide 24x7 support

- DNS, Route Collector, Route Servers

- Approx 1600 no of prefixes
Category of members

- Internet Service Provider
- Broadband Provider
- Content Provider
- Webhosting
- Data Centre Provider
- Co-location Provider
- IPTV
- Education
1. **Chairman** – AIMS Data Centre Sdn Bhd
2. **Deputy Chairman** – Telekom Malaysia Berhad
3. **Secretary** – Maxis Broadband Sdn Bhd
4. **Assistant Secretary** – Jaring Communications S Bhd
5. **Treasurer** – TT dotCom Sdn Bhd

**Committee Member**

6. P1 Networks(M) Sdn Bhd
7. REDtone-CNX Sdn Bhd
8. MyKRIS Asia Sdn Bhd
9. Celcom Axiata Berhad
Membership Type & Criteria

- Ordinary members
  - voting members

- Associate members
  - non voting members

- Membership by invitation – write to us!

- www.myix.my
<table>
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<th>Ordinary Members</th>
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<tr>
<td>Telekom Malaysia Bhd</td>
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<td>Jaring Communications S B</td>
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<td>Packet One Networks</td>
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<td>Celcom Axiata</td>
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<td>V Telecoms Bhd</td>
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<td>NTT MSC Sdn Bhd</td>
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<td>Optical Comm. Engineering</td>
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<td>Macro Lynx Sdn Bhd</td>
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<td>Extreme Broadband Sdn Bhd</td>
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<td>YTL Communications</td>
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<td>Sedco Communications</td>
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<td>Mudah.my</td>
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<td>Gigabit Hosting</td>
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<td>MyKris Penang</td>
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<td>ACME (Webserver)</td>
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<td>Tune Music</td>
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MyIX Charges

• Membership charges: RM 2500 annually

• Port charges
  Fast Ethernet (100 Mbps): RM 500 / month
  Gigabit Ethernet (1Gbps): RM 1000 / month
  10G Gigabit Ethernet: RM 3000 / month

• Bandwidth charges
  Starting from RM 425 / month for 10Mbps onwards.

• Quarterly billing
Your inquiries, comments, feedback please email to:

raja.mohan@myix.gov.my
THANK YOU