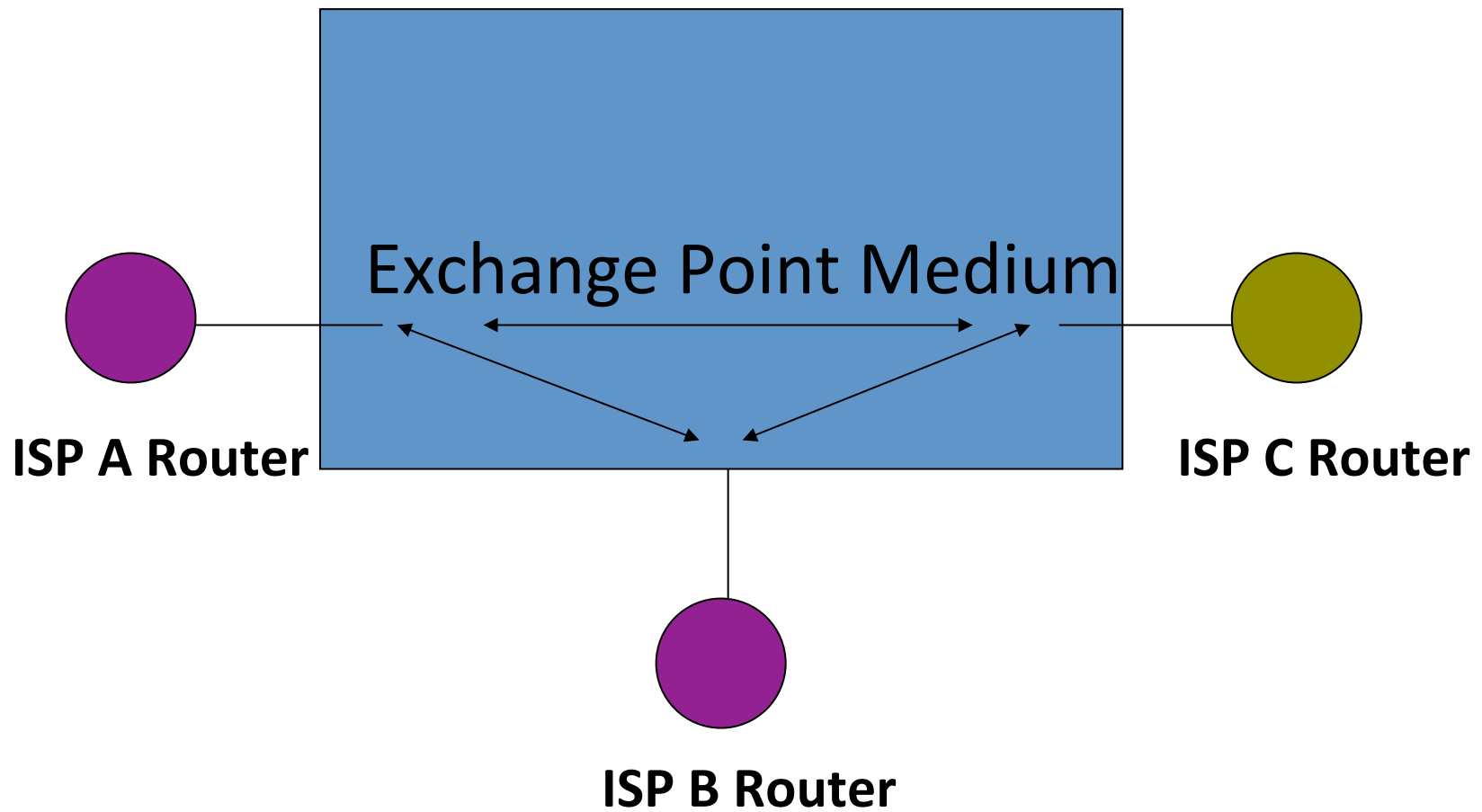# Internet Exchange Point (IXP)

- What is an Internet Exchange Point (IXP) ?

- Why ISPs participate in IXPs ?

- Why IXPs are important ?

- Malaysia Internet Exchange

- ❑ 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

Internet Exchange Point
Why Peer ?

❑ 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 ?
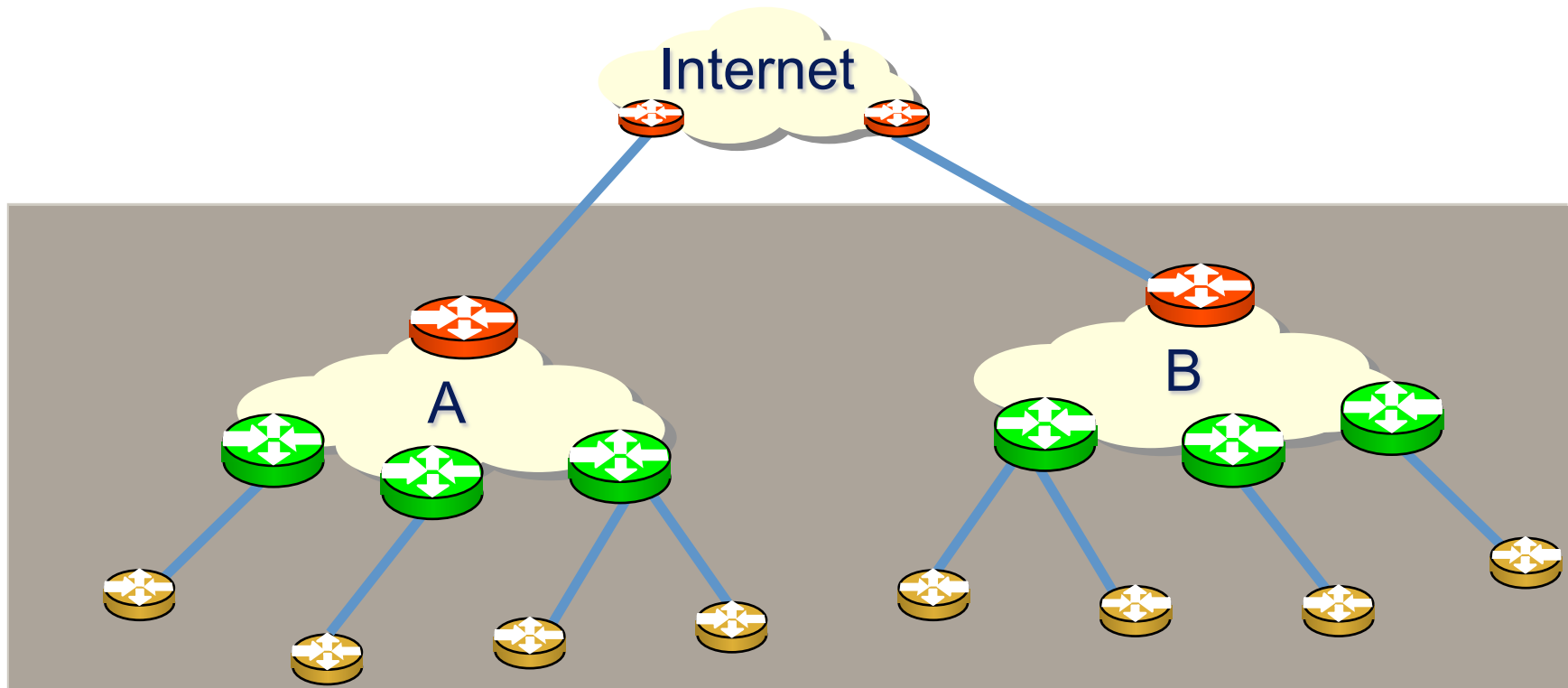- ▪ Via the international connections

International bandwidth…

- Longer RTT, more hops
- Costs significantly more than domestic bandwidth
- Is congested with local traffic

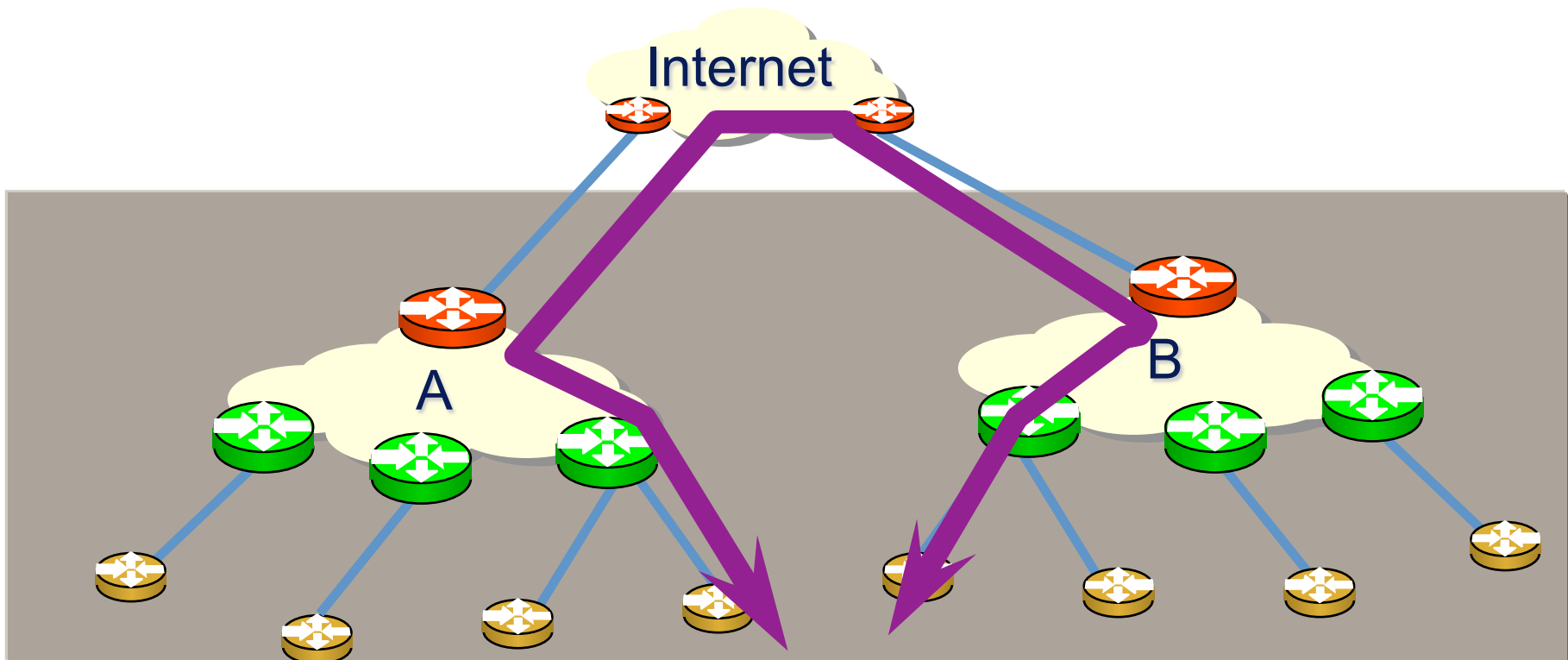# Wastes money, harms performance

❑ Multiple service providers

❑ Each with Internet connectivity

❑ Is not cost effective

❑ Backhaul issue causes cost to both parties
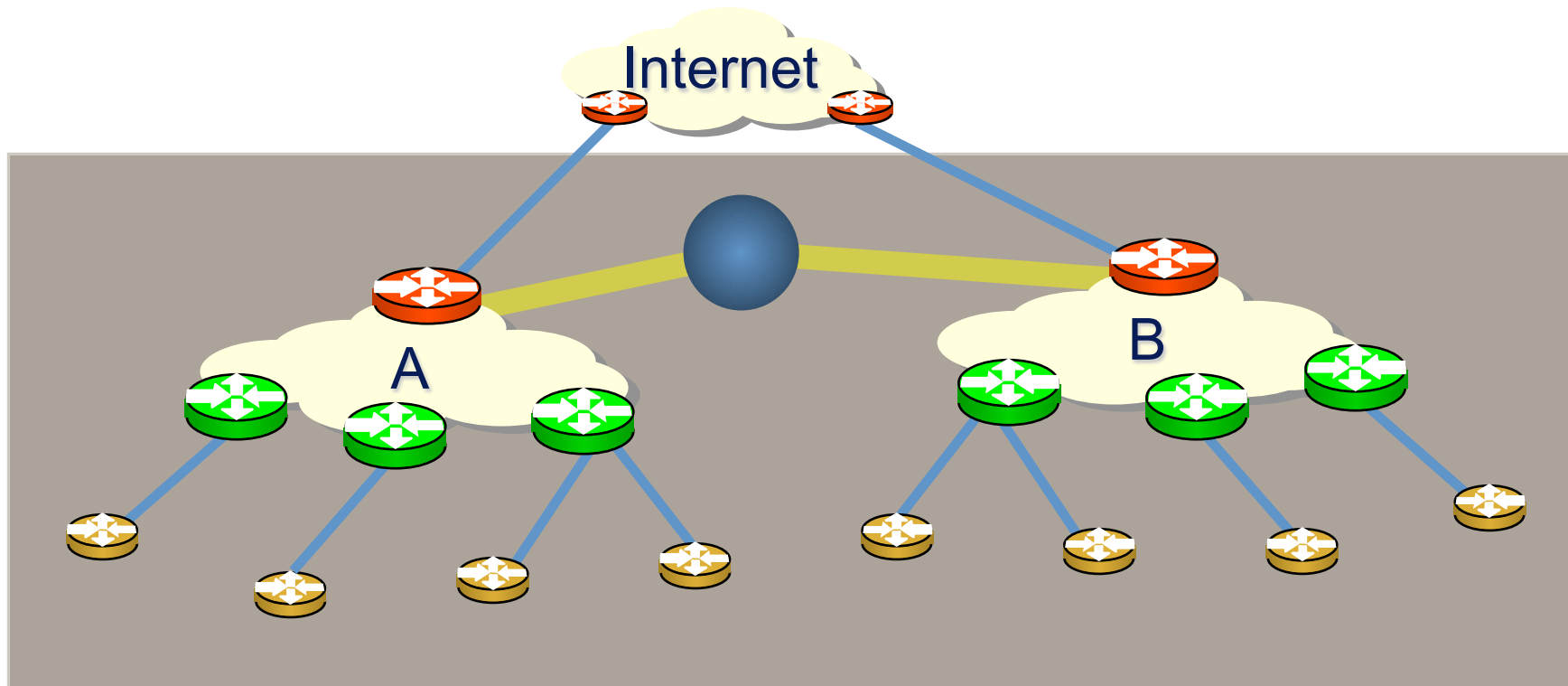
Internet Exchange Point
Why Peer ?

❑ 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

❑ 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

Internet Exchange Point

❑ Ethernet switch in the middle
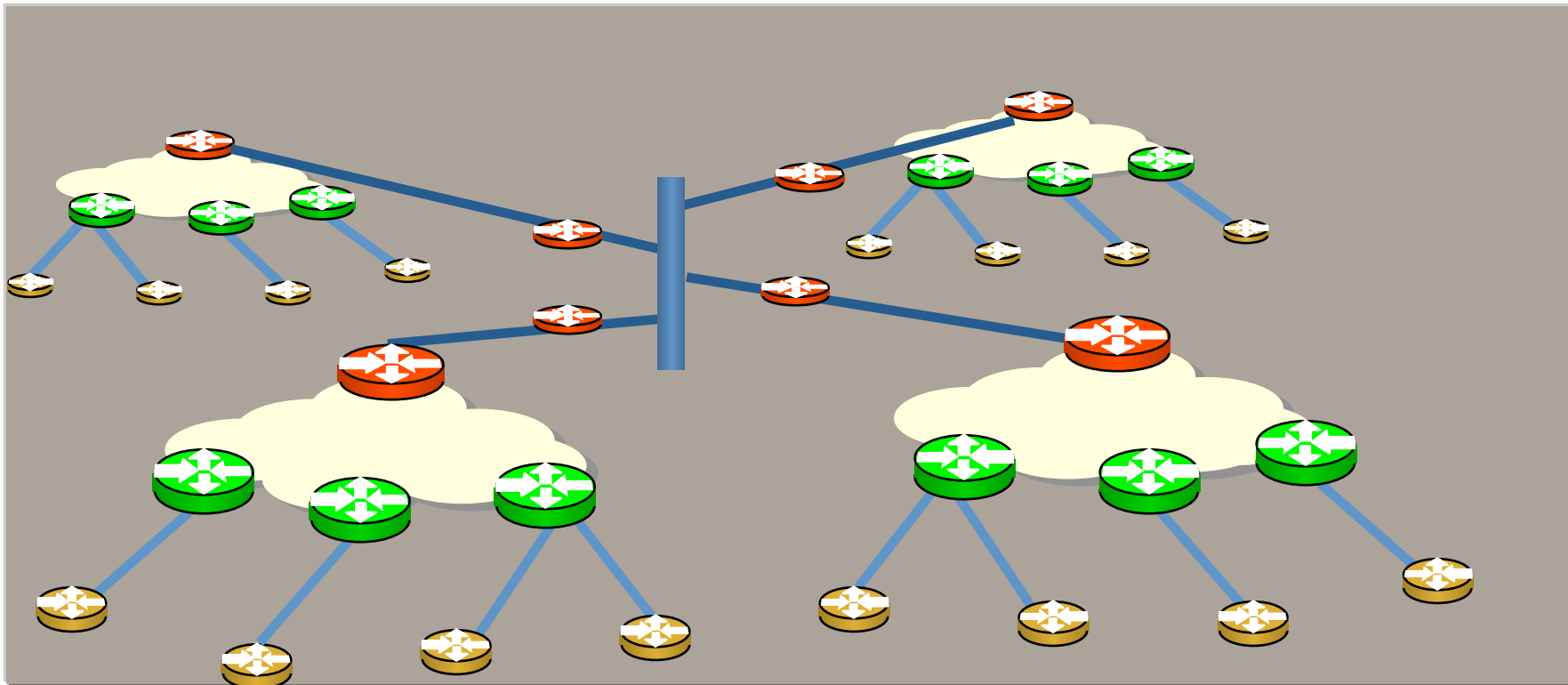
❑ **SAVES MONEY!!!**

- 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 December15, 2006

❑ Funded by the government

❑ Support from Regulator

❑ Managed and operate by the industry players

Flow of Local Traffic with Internet Exchange
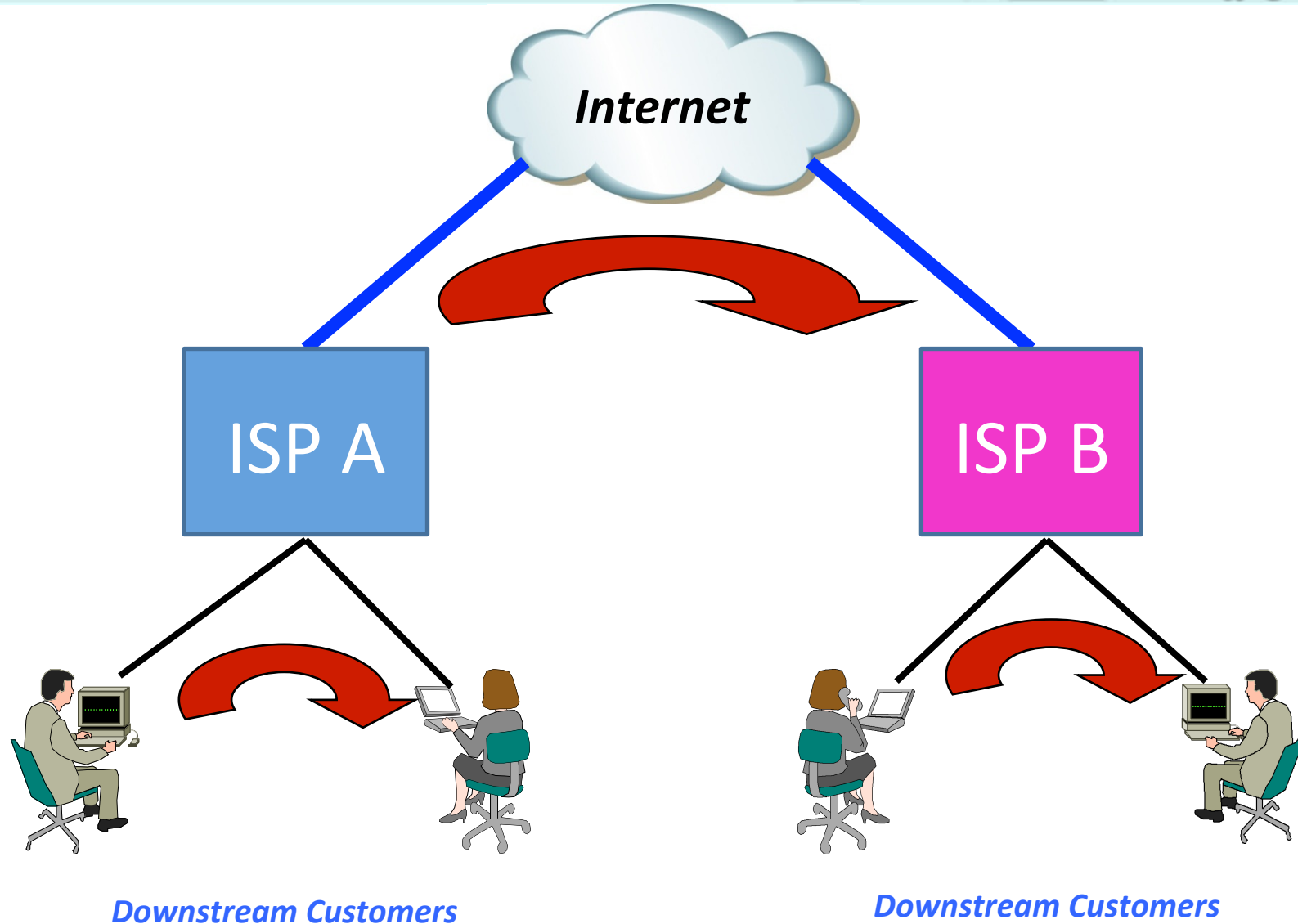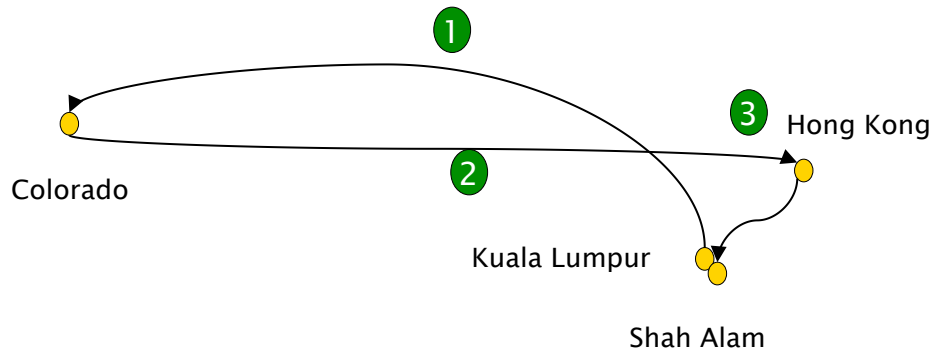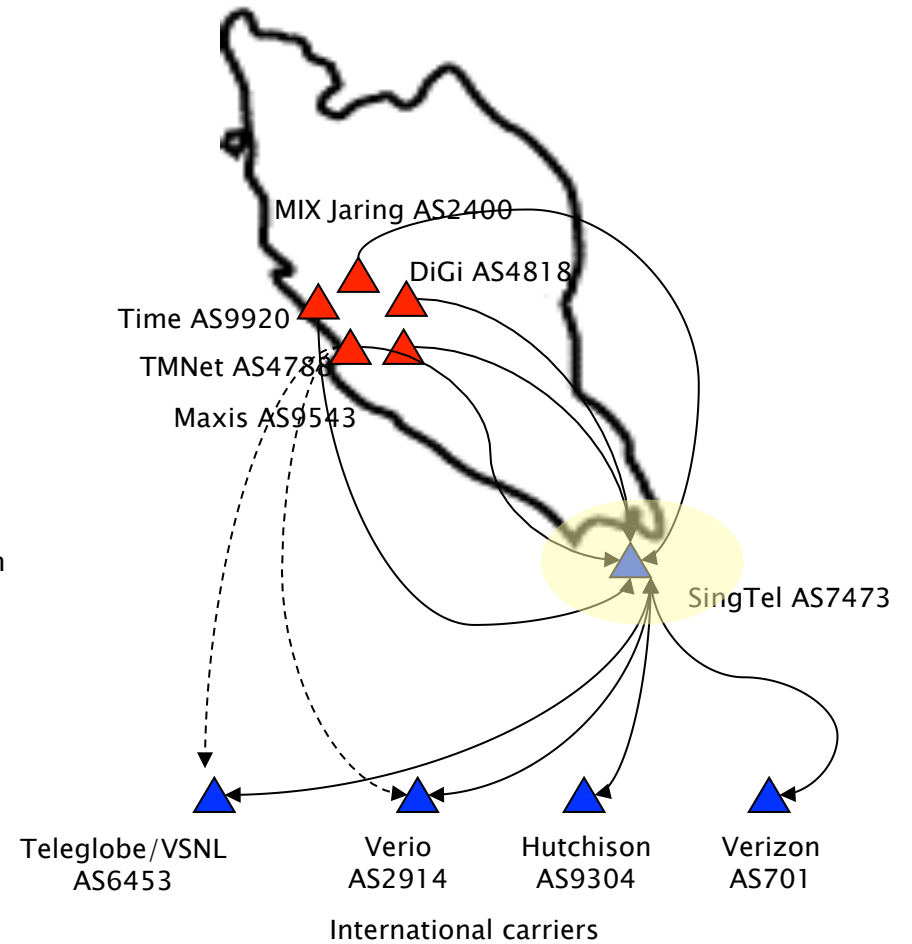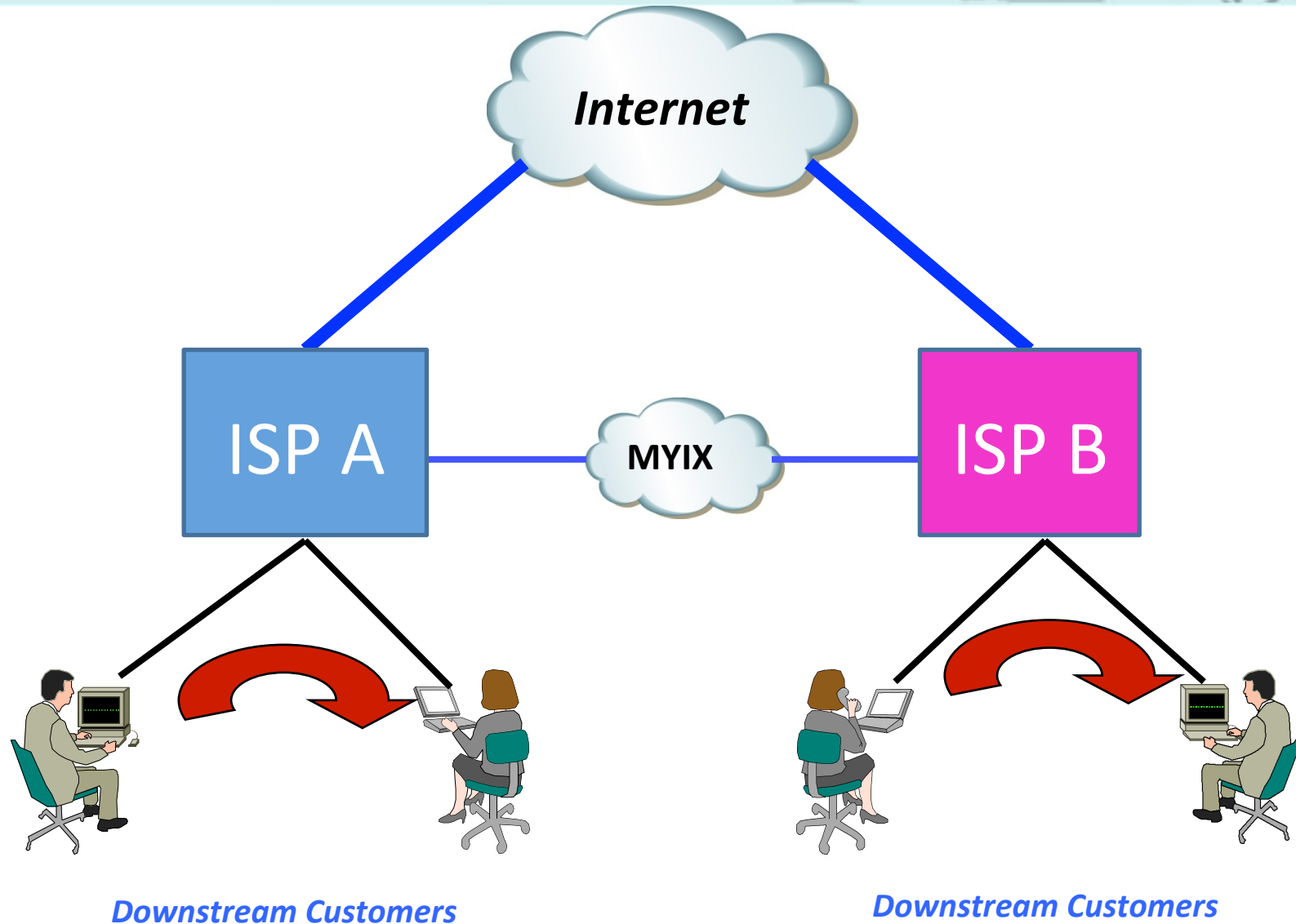
Ping Results (Not via MyIX)

[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

Ping Results (via MyIX)

[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

Traceroute Results (Not via MyIX)

```
[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 ~]#
```

Traceroute Results

[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 Network

MyIX — Malaysia Internet Exchange

- Kuantan CER2024C
- Kuantan CER2024F
- TM01
- TM02
- JARING01
- AIMS01
- 10 Gbps RING
- K Kinabalu CER2024F
- JARING02
- AIMS02
- Kuching CER2024F
- K Kinabalu CER2024C
- Kuching CER2024C
- Johor Bharu CER2024F
- Bayan Baru CER2024F
- Johor Bharu CER2024C
- Bayan Baru CER2024C
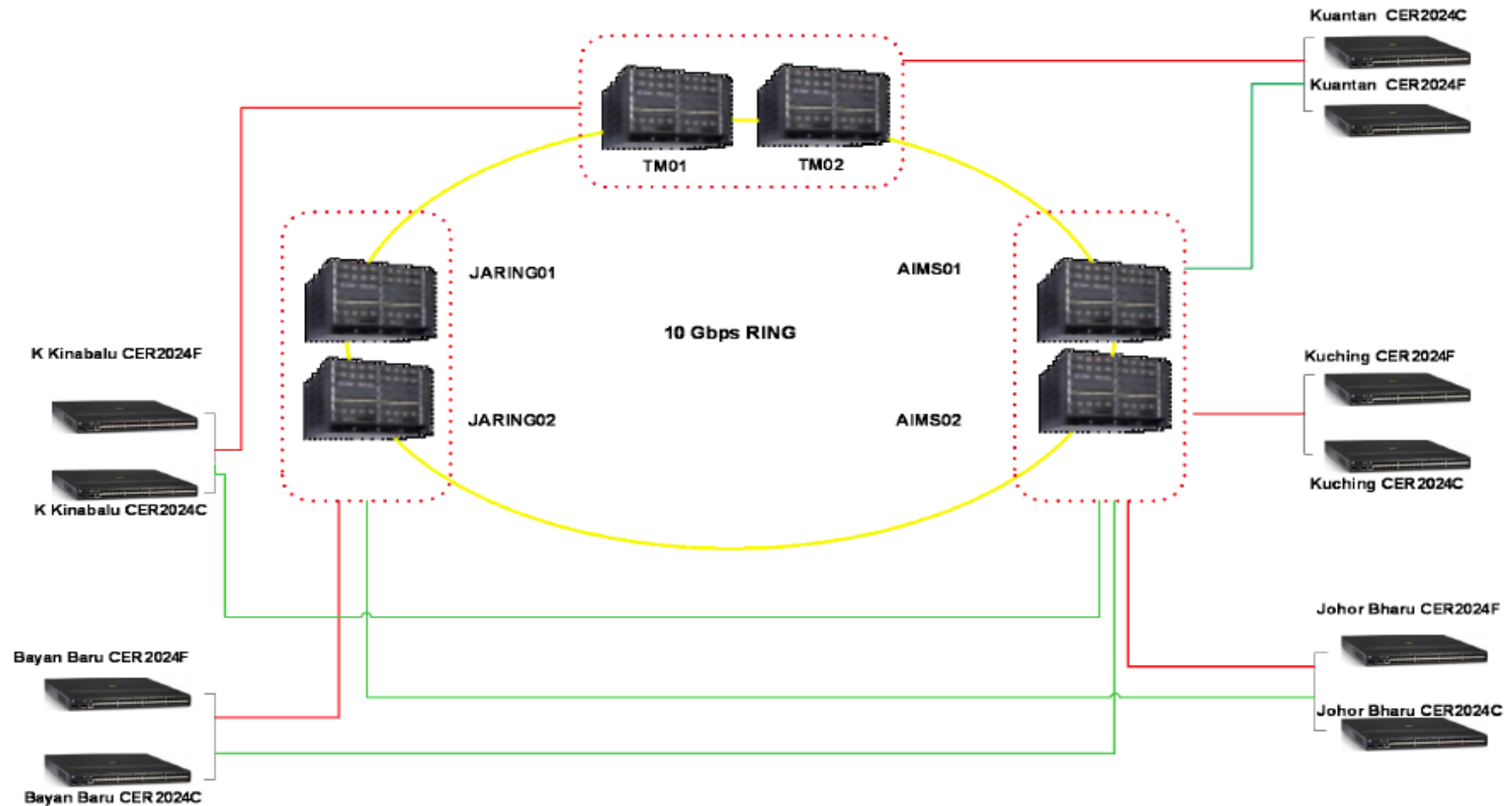
LEGEND
- Primary Link (1G)
- Secondary Link (1G)
- 10G Link
- Brocade MLX-8
- CER 2000

Central Nodes

MyIX — Malaysia Internet Exchange

CSF1 / CBJ 5
CyberJaya

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

10 Gbps Ring

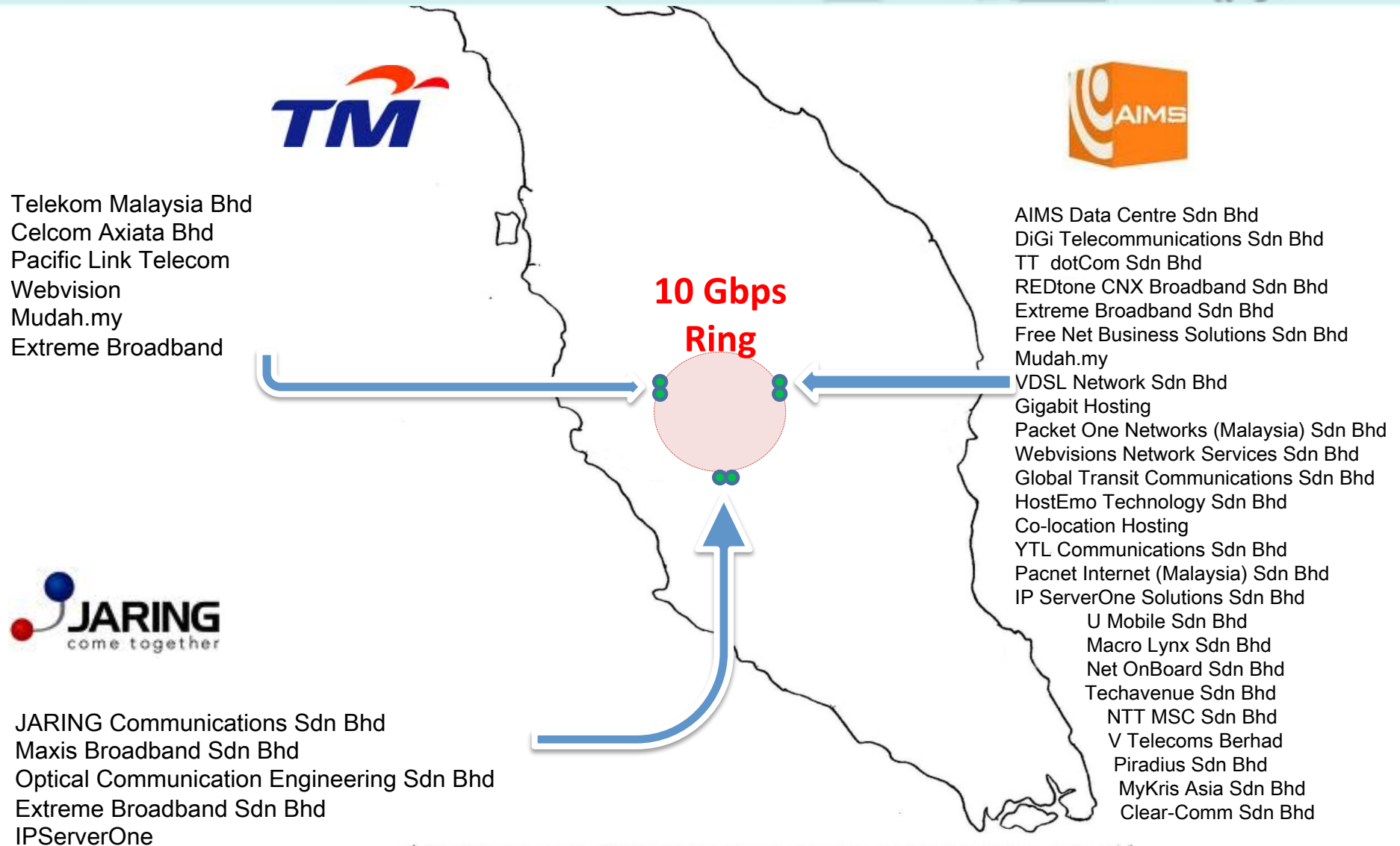JARING — come together
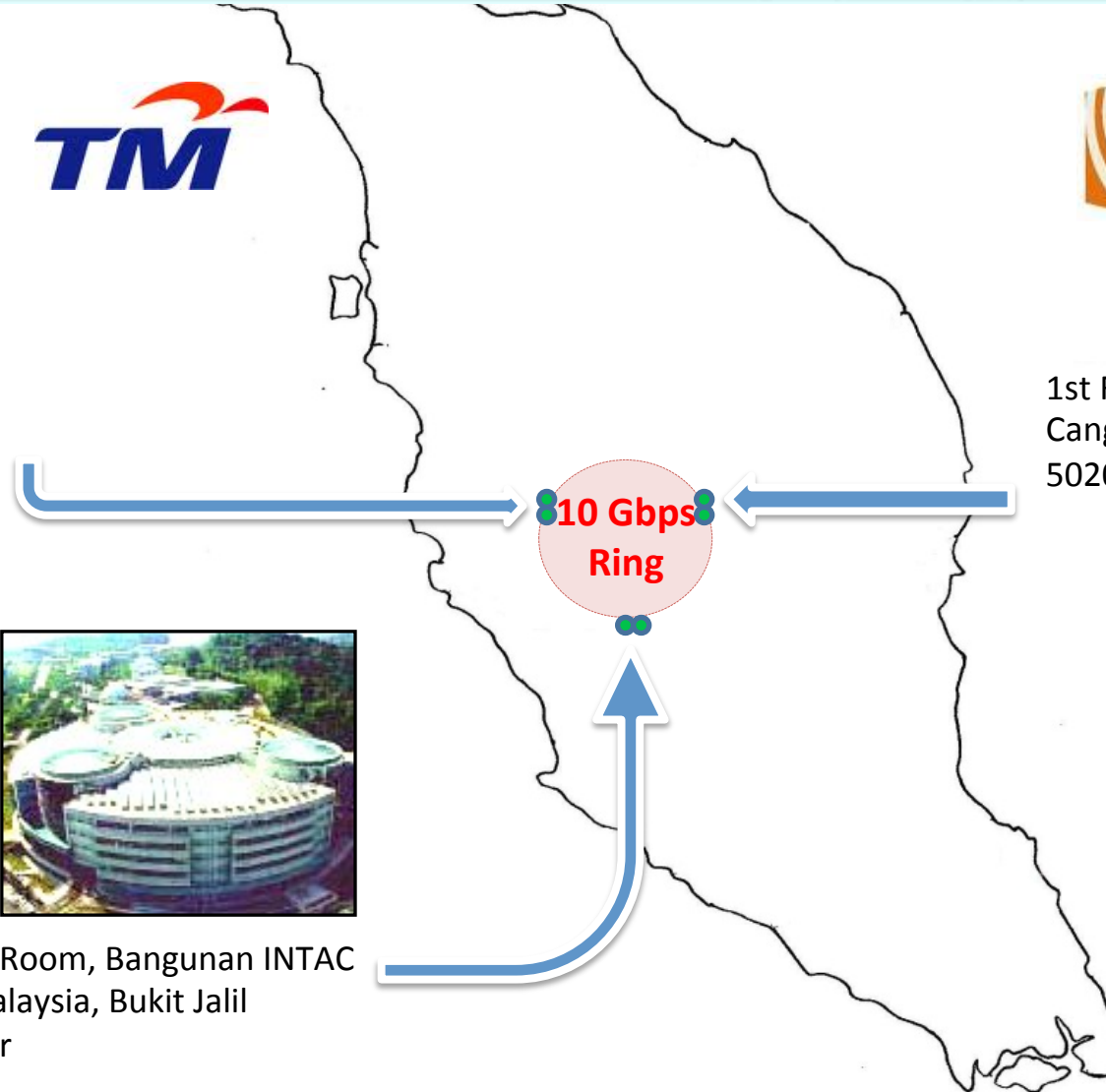
Ground Floor Telco Room, Bangunan INTAC
Technology Park Malaysia, Bukit Jalil
57000 Kuala Lumpur

Peering at Central Nodes

MyIX — Malaysia Internet Exchange

TM

Telekom Malaysia Bhd
Celcom Axiata Bhd
Pacific Link Telecom
Webvision
Mudah.my
Extreme Broadband

10 Gbps Ring

AIMS

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
IP 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 — come together

JARING Communications Sdn Bhd
Maxis Broadband Sdn Bhd
Optical Communication Engineering Sdn Bhd
Extreme Broadband Sdn Bhd
IPServerOne

MyIX

Malaysia Internet Exchange

Regional Nodes

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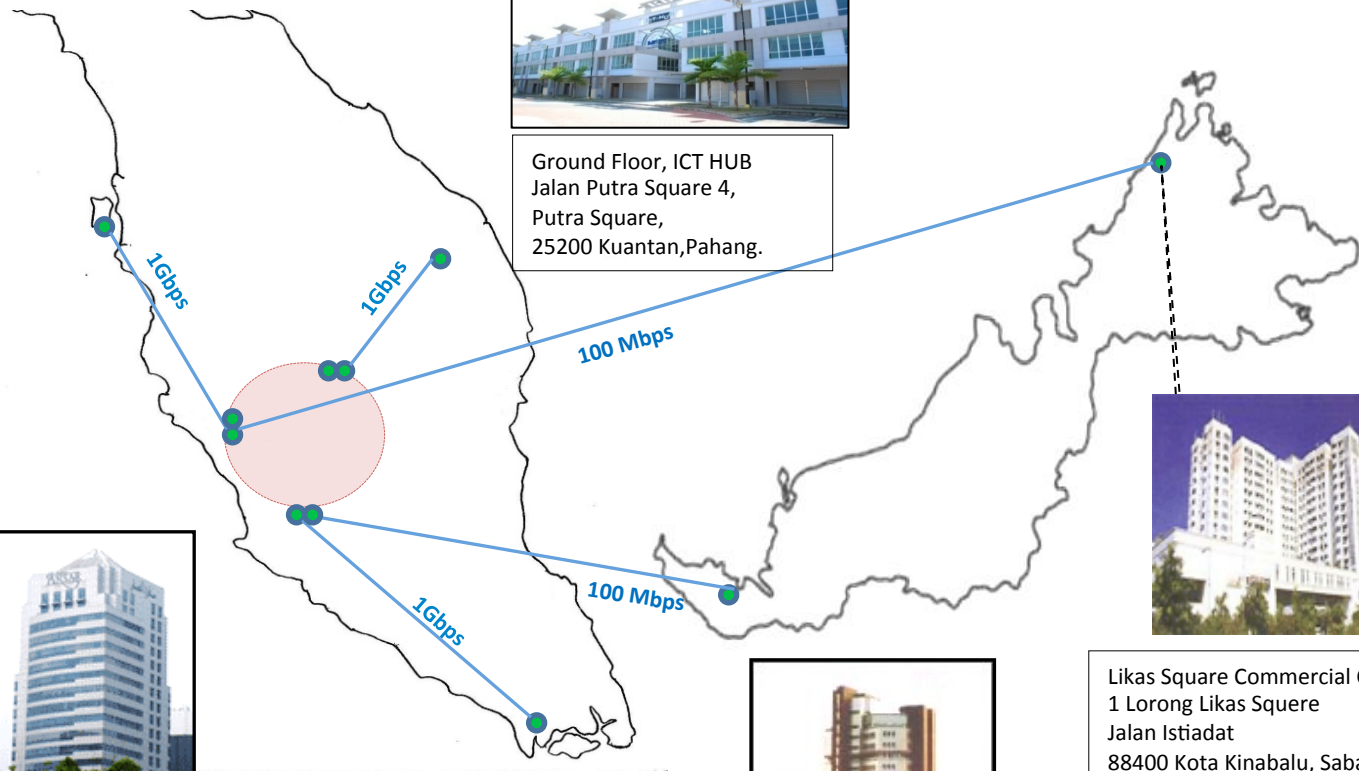Penang Cybercity,
Jalan Lintang Mayang
Pasir, 11950 Penang

MyKris Penang

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

1Gbps

1Gbps

100 Mbps

1Gbps

100 Mbps

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

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

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

KKIPC

Sedco Communications
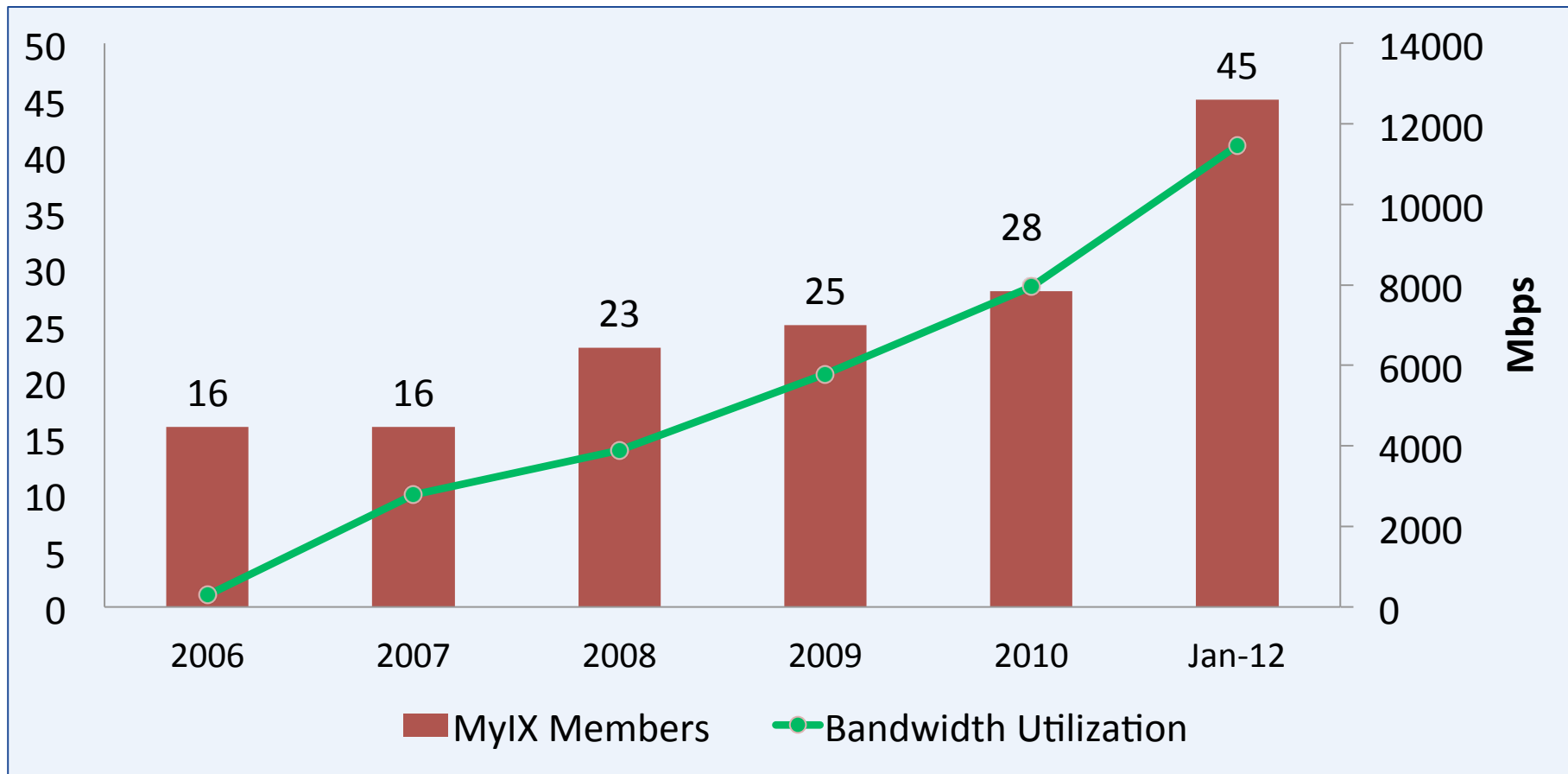
- ❑ Redundancy
    - ▪ Redundant link, switches

- ❑ 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**

2011 Committee

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

MyIX
Malaysia Internet Exchange

Membership Type & Criteria

- ✓ **Ordinary members**
  - ❖ **voting members**

- ✓ **Associate members**
  - ❖ **non voting members**

- ✓ **Membership by invitation – write to us !**

- ✓ **www.myix.my**

Ordinary Members

Telekom Malaysia Bhd	AIMS Data Centre
Jaring Communications S B	Maxis Broadband
Packet One Networks	Redtone-CNX
Celcom Axiata	MyKris Asia
V Telecoms Bhd	TT Dotcom Sdn Bhd
VDSL Network Sdn Bhd	Clear-Comm Sdn Bhd
NTT MSC Sdn Bhd	U Mobile Sdn Bhd
Optical Comm. Engineering	Global Transit
Macro Lynx Sdn Bhd	DIGI
Extreme Broadband Sdn Bhd	Free Net
YTL Communications	HeiTech Padu
Sedco Communications	Measat Broadcast
KKIPC	

Associate Members

Monash University

PP Telecoms

Pacnet Internet Malaysia

Pacific Link Telecom

Webvision

Piradius

IP Server one

Hostemo Technology

NetOnBoard

Techavenue

Fox Data

MNC Wireless

Exabyte

Aktif Setegap

Colocation Hosting

Mudah.my

Gigabit Hosting

MyKris Penang

ACME (Webserver)

Tune Music

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