# Philippine Open Internet Exchange

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AP * Retreat
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Manila, Philippines

# Outline

- What are internet exchanges (IX)?
- Why do we need an IX in the country?
- What are the existing IXs?
- Why make another one?
- What is PHOpenIX?
- Who are its members?
- Who are its “future” members?

# What are IXs?

Wikipedia's definition

- An Internet exchange point (IX or IXP) is a physical infrastructure that allows different Internet service providers (ISPs) to exchange Internet traffic between their networks (autonomous systems) by means of mutual peering agreements, which allow traffic to be exchanged **without cost**.

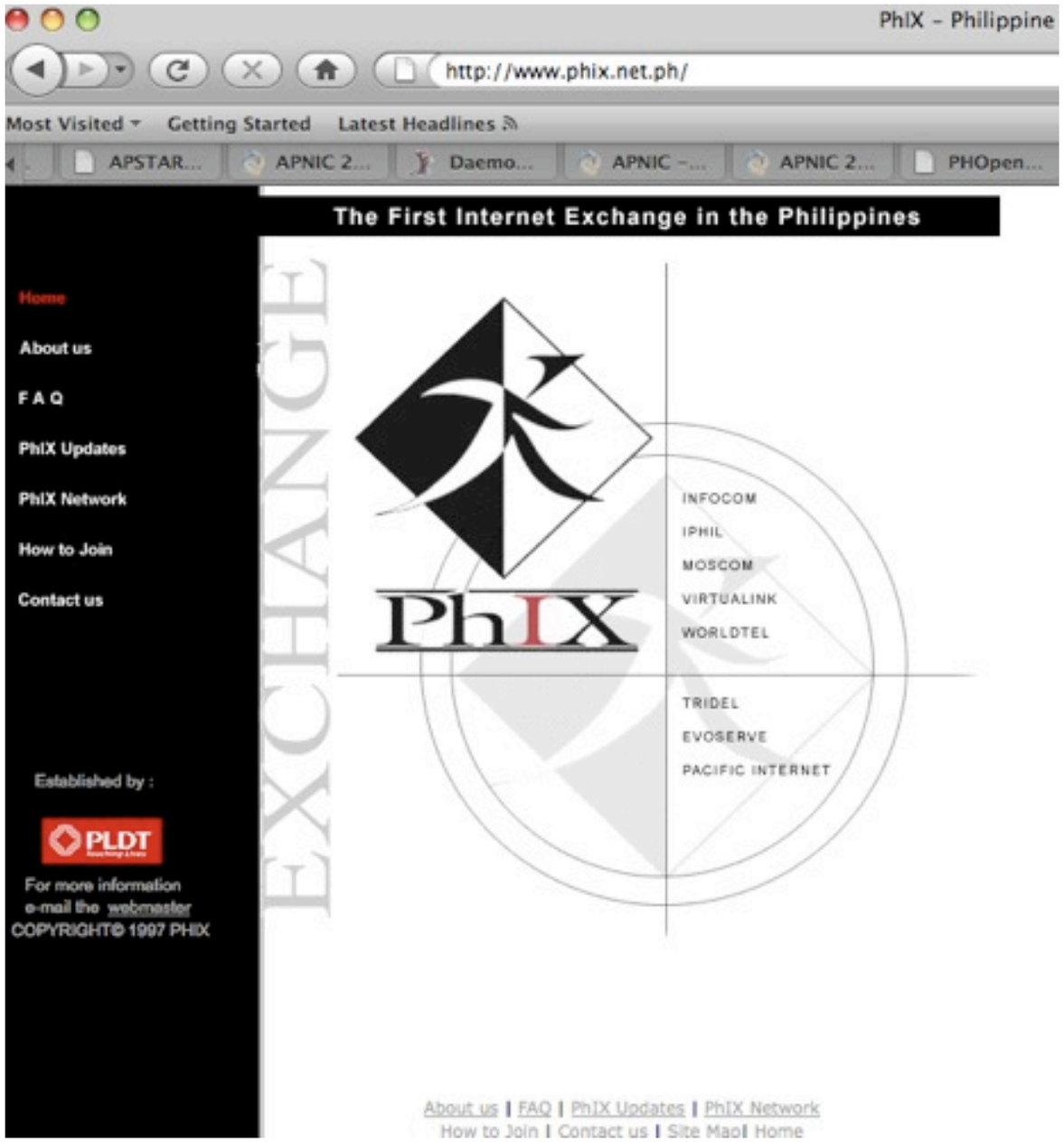
# Why do we need an IX in the country?

- IXPs reduce the portion of an ISP's traffic which must be delivered via their upstream transit providers (monetary savings)
- Furthermore, the increased number of paths learned through the IXP improves **routing efficiency** and **fault-tolerance**

# Why do we need an IX in the country?

```
bblara@router:~$ traceroute www.globe.com.ph
traceroute to www.globe.com.ph (203.177.23.57), 30 hops max, 40 byte packets
 1  linksys (192.168.0.2)  0.734 ms  0.619 ms  0.576 ms
 2  210.213.218.254.pldt.net (210.213.218.254)  67.496 ms 58.69.116.254.pldt.net (58.69.116.254)  5.304 ms 210.213.218.254.pldt.net (210.213.218.254)  69.126 ms
 3  58.69.255.61 (58.69.255.61)  5.408 ms 210.213.255.81.pldt.net (210.213.255.81)  65.760 ms 58.69.255.61 (58.69.255.61)  37.206 ms
 4  58.71.0.92 (58.71.0.92)  73.489 ms 58.71.0.157 (58.71.0.157)  165.374 ms 58.71.0.92 (58.71.0.92)  73.437 ms
 5  if-15-0.mcore3.LAA-LosAngeles.as6453.net (216.6.84.25)  396.120 ms if-1-1.core3.HK2-HongKong.as6453.net (116.0.82.37)  298.984 ms if-15-0.mcore3.LAA-LosAngeles.as6453
.net (216.6.84.25)  762.593 ms
 6  if-5-0-0.core1.TV2-Tokyo.as6453.net (116.0.82.2)  308.238 ms Vlan76.icore1.LAA-LosAngeles.as6453.net (216.6.84.74)  200.462 ms if-5-0-0.core1.TV2-Tokyo.as6453.net (11
6.0.82.2)  306.375 ms
 7  4.68.63.65 (4.68.63.65)  218.064 ms if-0-0-0-736.mcore3.LAA-LosAngeles.as6453.net (209.58.61.34)  304.947 ms 4.68.63.65 (4.68.63.65)  227.850 ms
 8  Vlan76.icore1.LAA-LosAngeles.as6453.net (216.6.84.74)  314.907 ms vlan99.csw4.LosAngeles1.Level3.net (4.68.20.254)  338.522 ms Vlan76.icore1.LAA-LosAngeles.as6453.net
 (216.6.84.74)  310.505 ms
 9  ae-83-83.ebr3.LosAngeles1.Level3.net (4.69.137.41)  550.230 ms 4.68.63.65 (4.68.63.65)  320.270 ms ae-83-83.ebr3.LosAngeles1.Level3.net (4.69.137.41)  325.753 ms
10  vlan99.csw4.LosAngeles1.Level3.net (4.68.20.254)  321.210 ms ae-2.ebr3.SanJose1.Level3.net (4.69.132.9)  357.398 ms vlan69.csw1.LosAngeles1.Level3.net (4.68.20.62)  3
21.410 ms
11  ae-63-63.csw1.SanJose1.Level3.net (4.69.134.226)  880.339 ms ae-73-73.ebr3.LosAngeles1.Level3.net (4.69.137.37)  312.985 ms ae-63-63.csw1.SanJose1.Level3.net (4.69.13
4.226)  592.188 ms
12  ae-2.ebr3.SanJose1.Level3.net (4.69.132.9)  318.609 ms ae-12-69.car2.SanJose1.Level3.net (4.68.18.4)  734.379 ms ae-2.ebr3.SanJose1.Level3.net (4.69.132.9)  316.566 m
s
13  * * *
14  ae-22-79.car2.SanJose1.Level3.net (4.68.18.68)  313.277 ms 203.177.15.78 (203.177.15.78)  608.467 ms  708.372 ms
15  * 203.177.31.38 (203.177.31.38)  603.769 ms *
16  203.177.59.20 (203.177.59.20)  551.984 ms 203.177.15.78 (203.177.15.78)  491.386 ms 203.177.59.20 (203.177.59.20)  734.827 ms
17  203.177.31.165 (203.177.31.165)  471.888 ms 203.177.69.134 (203.177.69.134)  521.196 ms 203.177.31.165 (203.177.31.165)  473.688 ms
18  * 203.177.59.20 (203.177.59.20)  475.428 ms *
19  203.177.69.134 (203.177.69.134)  471.045 ms *
```

# What are the existing IXs?



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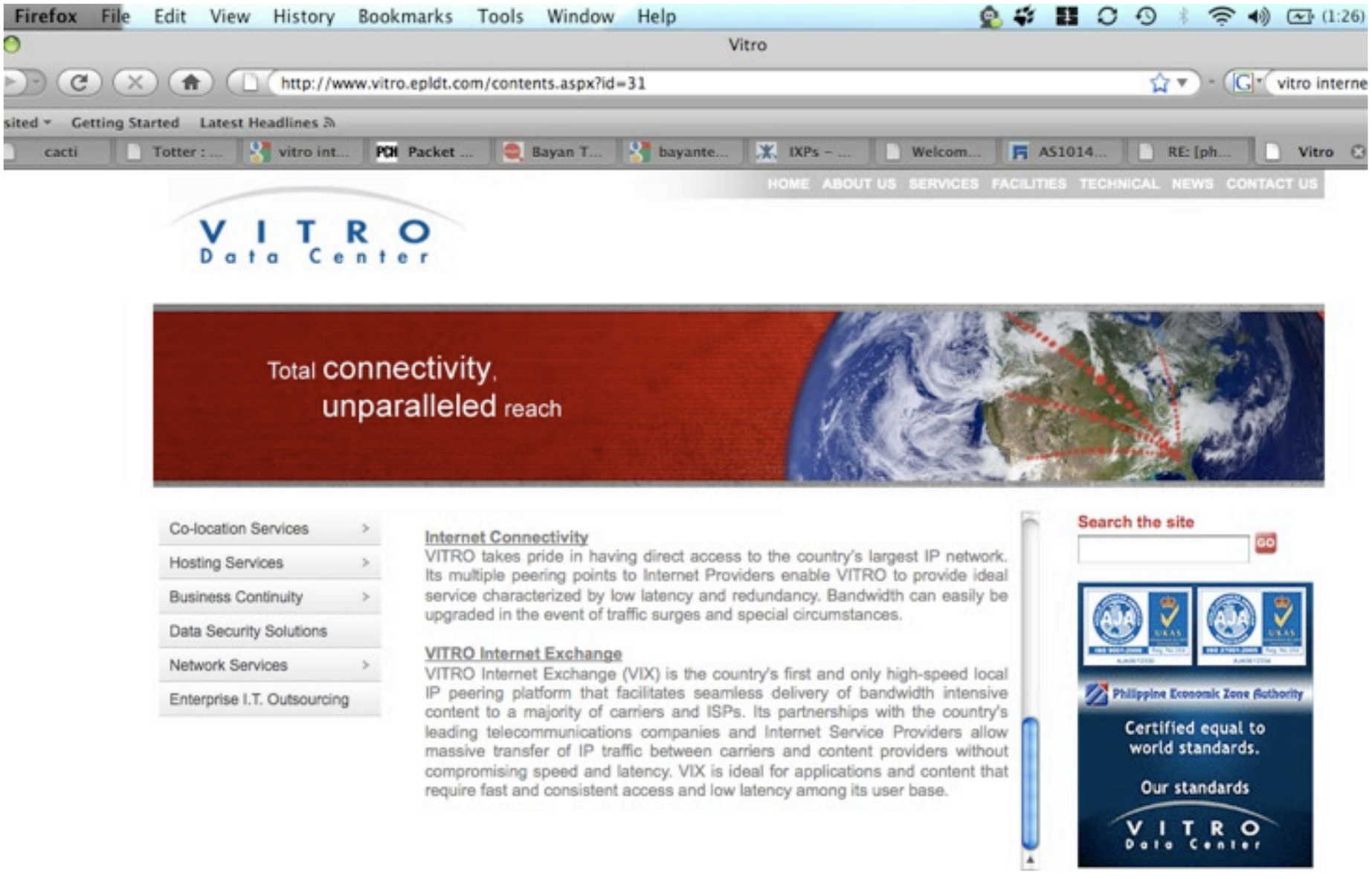

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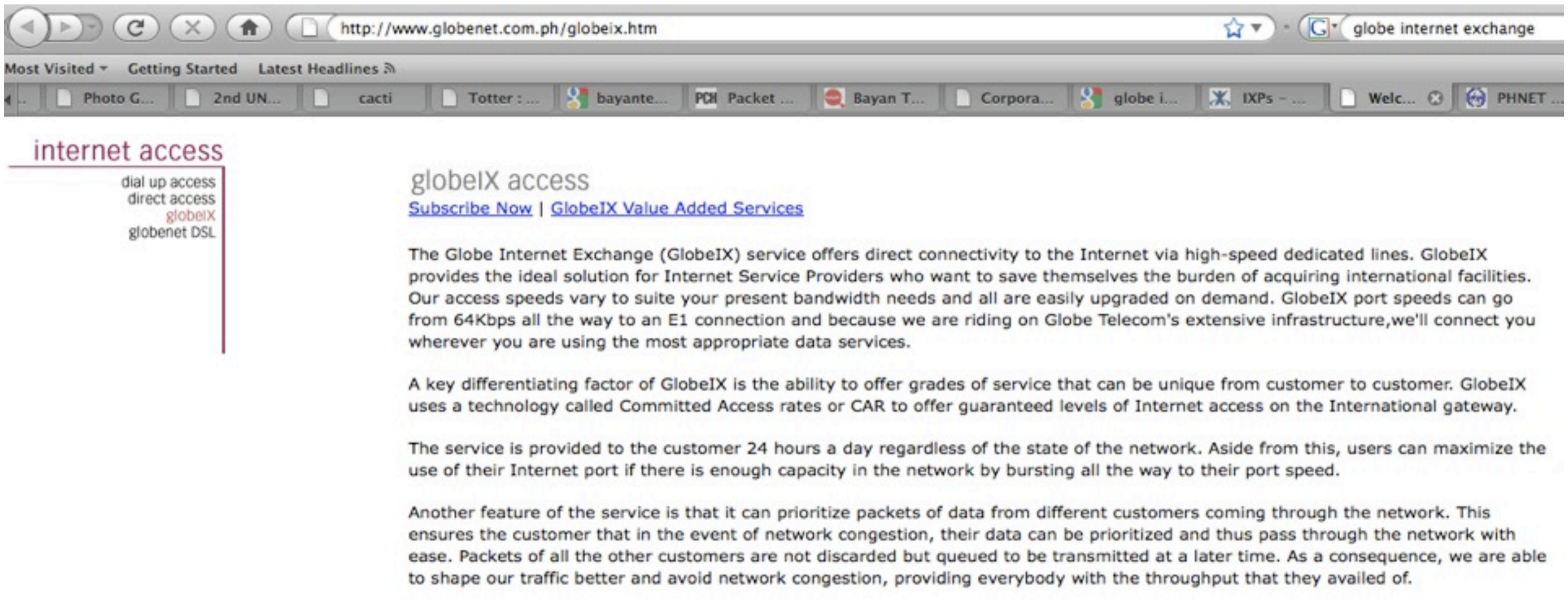

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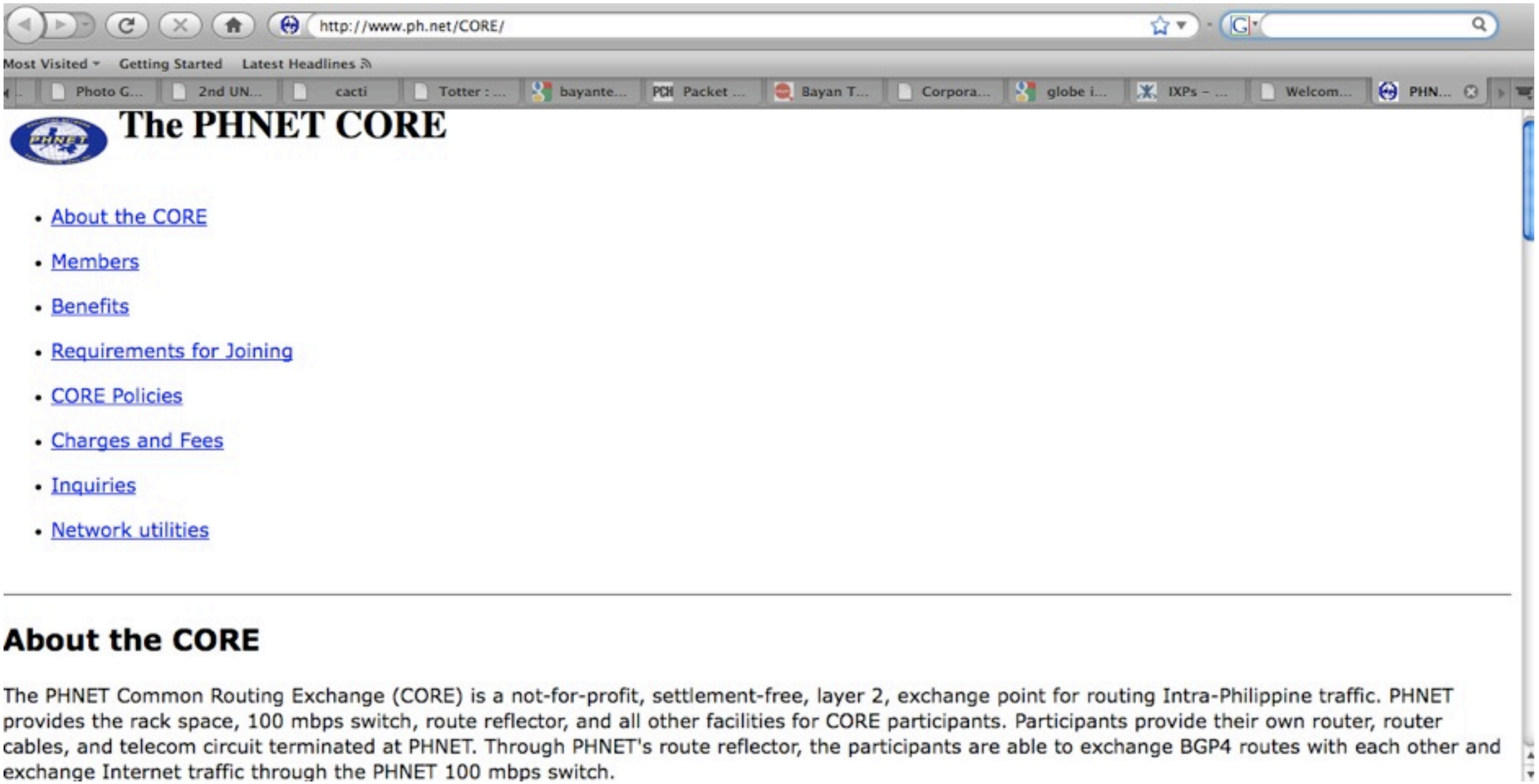
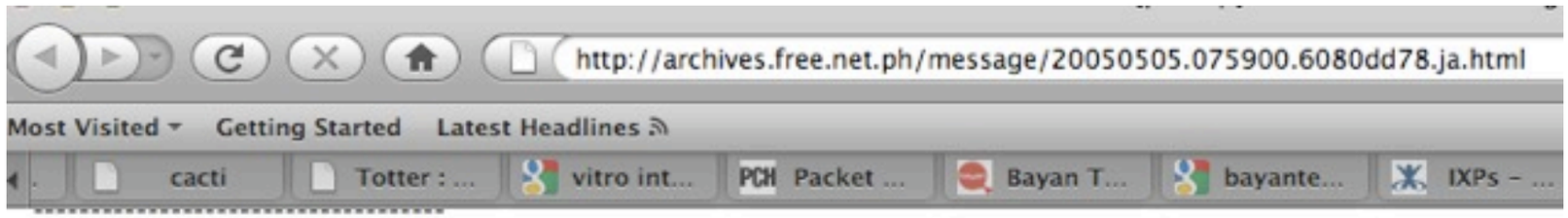


# What are the existing IXs?

# Why make another one?




-----Original Message-----
From: ph-isp-bounces@???
[mailto:ph-isp-bounces@???] On Behalf Of Rommell Barcela
Sent: Thursday, May 05, 2005 3:48 PM
To: PH-ISP Mailing List
Subject: Re: [ph-isp] Vitro Internet Exchange ("VIX")

Hi Maloy,

PLDT = PHIX
ePLDT = VIX

Maybe the gov't should take over this IX craze.

Cheers.

Mar Loreto Apuhin wrote:
*> Rommel, ano ang IX name ng PLDT?*

# Why make another one?

Maybe the gov't should take over this IX craze.

# Why make another one?

- Each “big” telco is putting up its own IX and nobody is making sure that these facilities are maximized in terms of improving routing of local traffic.

# What is PHOpenIX?

- Carrier-neutral IPv4 and IPv6 Multilateral Peering Exchange
- Layer 2 exchange (supports 10/100/1000 BaseT interconnect)
- BGP Peering (member needs own AS number)

# What is PHOpenIX?

- Managed and operated by ASTI
- First come, first connect policy
- Open to all networks
- Non-profit membership based exchange
- No financial model as of now

# What is PHOpenIX?

- About ASTI
  - ICT and Electronics research arm of Department of Science and Technology
    - manages and operates the Philippine Research, Education and Government Information Network (PREGINET)
    - operates and maintains the gov.ph registry

# What is PHOpenIX?

Supported by:

- PH Network Operators Group (PHNOG)
- Asia Pacific Network Information Center
- Globe/Innove
- Packet Clearing House
- EP.Net (Bill Manning)
- Netnod/Autonomica (I-Root operators)
- Cisco

# Who are its members?

- January 2007 - the launch of the IX during the Manila hosting of the APAN meeting

- April 2007 - PREGINET and Bistop are the first networks to join the IX

# Who are its members?

- May 2007 - installation of the the core switch, monitoring servers, PCH ccTLD and looking glass with the help of Gaurab Raj Upadhaya (PCH) and Amante Alvaran (APNIC)
- August 2007 - I-Root DNS anycast instance goes is operational

# Who are its members?

- August 2007 - Globe/Innove joins the IX
- December 2007 - International Rice Research Institute and Bell Telecom joins the IX
- February 2008 - PhilCom Inc. joins the IX

# Who are its “future”

# members

From: Amante Alvaran
Reply-To: amante@apnic.net
Date: 9/20/07 1:36 PM
To: Gaurab Raj Upadhaya
Cc: Steve Gibbard <scg@pch.net>, Denis F. Villorente, bani, Ceejay Dideles <ceejay@asti.dost.gov.ph>

-----BEGIN PGP SIGNED MESSAGE-----
Hash: SHA1

Hi Mants,

can u get bani, ceejay and dennis in the loop here. Steve Gibbard, my
colleague at PCH does this analysis every month.

It may even be interesting to show that what number of DNS queries they
can send locally by coming to PhOpenIX. which otherwise they seem to be
sending to Hongkong.

this is the query pattern to our own anycast server with 18 ccTLDs,
hosted in Manila.

- ----

Here are DNS query distribution maps from Tuesday, September 11.

<snip>
We're getting no significant amount of traffic into the node in Manila.
The big Philippine query sources.  The big Philippine networks that it
would be useful to have connect to the exchange and peer with us are:

| | | |
|---|---|---|
| 17866 | AS9299 | IPG-AS-AP Philippine Long Distance Telephone Company |
| 8752 | AS6648 | ASN-SKYINTERNET Bayan Telecommunications Inc. |
| 2888 | AS7629 | INFOCOM-AS-AP INFOCOM Technologies, Inc. |
| 1845 | AS10139 | SMARTBRO-PH-AP Smart Broadband, Inc. |
| 1729 | AS9497 | DIGITELONE Digital Telecommunications Philippines Inc. |
| 1479 | AS18233 | PTT-AS-AP Philippine Telegraph and Telephone Corporation, |
| 1390 | AS7491 | PI-PH-AS-AP PI-PHILIPINES |
| 1116 | AS6163 | ERX-MOZCOM-NETWRK Mosaic Communications Inc. |

(the first column is the number of queries from the AS.  Currently, we're
getting 200 queries per day there).

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# Services at the IX

- PHOpenIX operates its services as part of AS4779
- Services available are:
  - DNS Root Instance
  - Route server
  - Time servers
  - Statistics
  - BPG Visualization

# Root DNS

- Operated by Netnod and Autonomica based in Stockholm, Sweden
- Only instance of a root DNS in the Philippines

# Route Server

- A route server will be available for IX partners free of charge
- Optional multilateral peering to the route server

# Looking Glass

- Looking glass are publicly accessible servers for performing routing queries and used to troubleshoot routing issues across the internet
- The PHOpenIX looking glass does not show the full internet routing table, just its peering routes

# NTP Server

- The IX is hosting a stratum 2 NTP server
- This is synchronized from the PAGASA Time Service Unit Stratum I GPS NTP PST
- ntp.phopenix.net

# IPv6 Transit

- PHOpenIX will be the first IX in the country to support IPv6
- PREGINET will provide commodity transit for IPv6 traffic from "IPv6-bilateral-peers"
- This is made possible thru PREGINET's APAN and TEIN3 links

# Hardware

- Core Switch
  - Cisco Catalyst 3560 with 48 Ethernet 10/100/1000 ports and 4 “vacant” SFP ports
  - 46 ports to go before we request for another switch from PCH :-)

# Hardware

- Router server
    - Cisco 2600
        - Quagga with IRRD
- FreeBSD netmon
    - Cacti

# Configuration

- Partners at the IX will install and operate their own routing infrastructure
- There will be several mandatory BGP peering requirements for every new partner to maintain and monitor the IX routing plane

# Configuration

- The Philippine Open Internet Exchange encourages each participants to establish bilateral BGP peering with other parties they are interested in

# BGP Peering Policy

- All partners are required to establish BGP peering to the following:
  - peering with the IX routeserver
  - peering with PCH Looking Glass
  - peering with the I-Root DNS anycast instance

# BGP Peering Policy

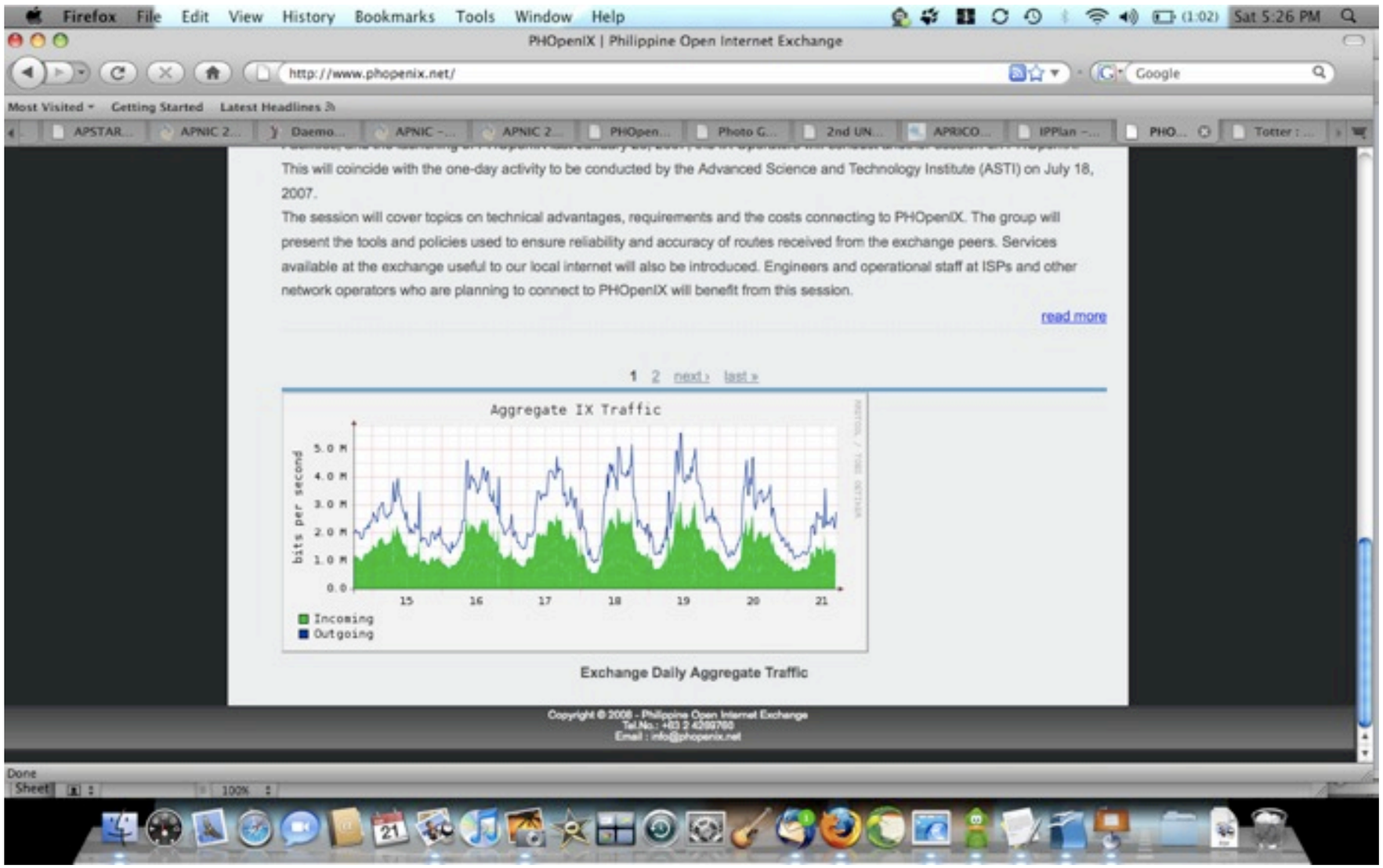
- Optional bilateral peering with other IX partners
- We are still working on the Internet Routing Registry IX driven model based on data from APNIC IRRd
- As an interim solution, manual updates of advertised and received routes will be announced at the members mail list

# Traffic Statistics

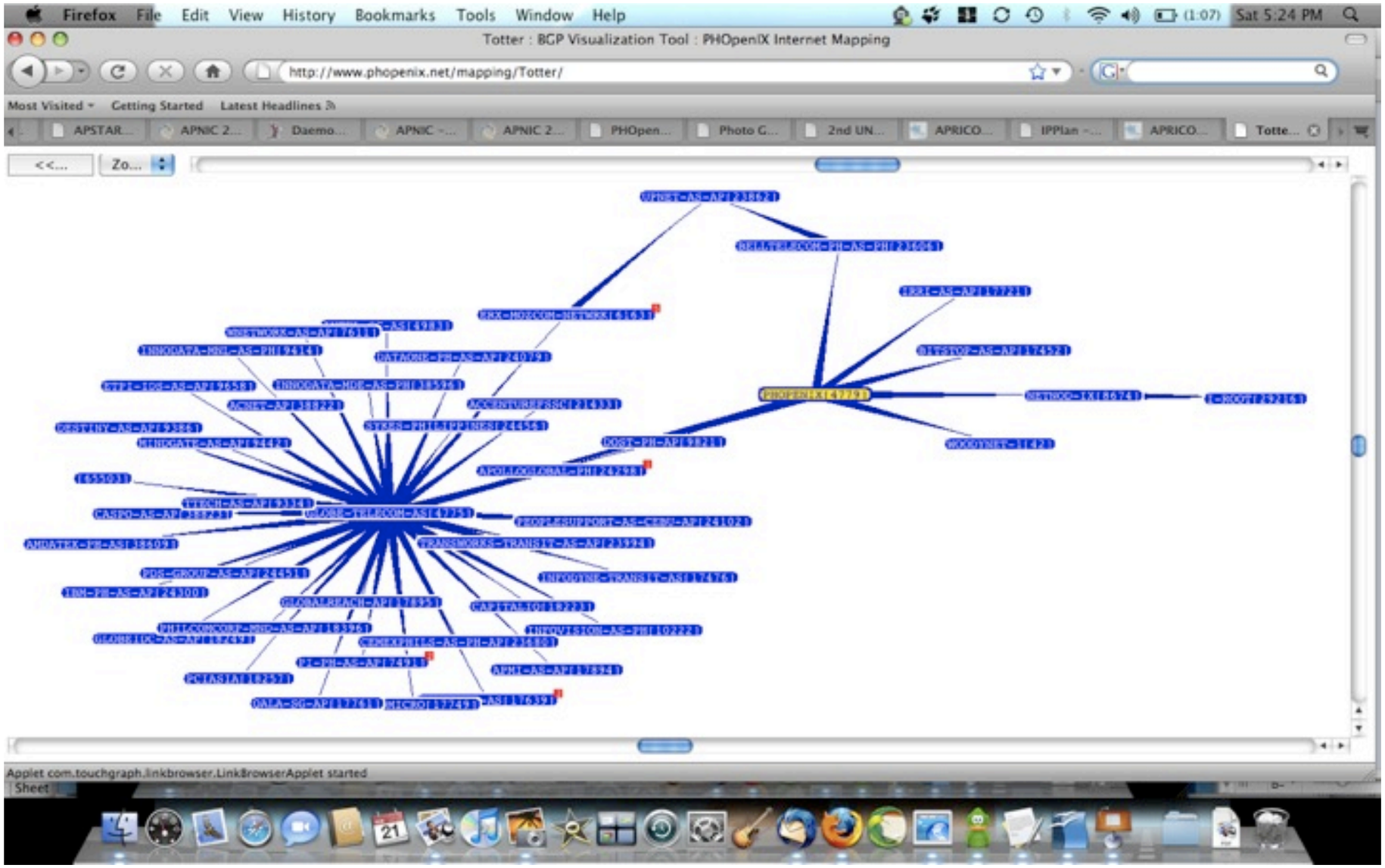
- Aggregate traffic statistics will be publicly available

- Per port statistics will be available via secure portal for each member

# Traffic Statistics



# BGP Visualization



# Target for 2009

- Major ISP/telco's already committed to be part of the exchange
- Initial talk with Google
- RPSL database implementation (irrd + quagga routing software)

# Target for 2009

- .ph ccTLD hosting
- IPv6 tunneling (ATP, Terado, 6to4, ISATAP)

www.phopenix.net/apstar_2009_phopenix.pdf

Bani Lara
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