# http://www.phopenix.net/ pacnog2015.pdf

# APAN 4 Marila

#### January 25-29, 2016

#### Marriott Hotel Manila

No. 10 Newport Boulevard, Newport City Complex, Pasay City, Metro Manila

http://www.apan.net/meetings/Manila2016/

## Philippine Open Internet eXchange Updates

November 30, 2015 Hyatt Hotel PacNOG, Guam, USA

Bani Lara Advanced Science and Technology Institute Department of Science and Technology

### Outline

- Benefits of peering
- How we started our IX
- How to promote the IX yourself
- How to get a big brother to help promote

### Benefit of peering



#### http://www.peeringforum.com

## Benefits of peering

- Lower latency (delay) of traffic exchange to other peers
- Encourages CDNs to put servers near the peering fabric, if there is enough peers
- Good location to do as many bilateral peering sessions as possible at a fraction of a cost

## Benefits of peering

- It can "possibly" lower your transit (internet port) traffic, which is usually more expensive
- Its a good place to form a community :-D

**ADDITIONAL INTERNET SERVICE PROVIDERS** 

#### TAMUNING, GU BROADBAND STATS

Guam is the 0 most connected state in the U.S.

Approximately 2,000 people in Guam County don't have access to any wired internet.

Only 0.0% of Guamanians have access to 100mbps or faster broadband.

In Guam County, approximately 134,000

Provider	Availability	Rating	Speed	Pricing
DSL		?		<b>\$75.00</b> for 15mbps
<b>docomo</b> CABLE		?		
Pacific Data Systems		?		



#### Based on http://bgp.he.net data





















Routing between customers of different ISPs without a common uplink



Routing between customers of different ISPs without a common uplink

















Multilateral peering thru a route server



#### Bilateral peering thru direct negotiations

## **METCALFE'S LAW**

#### value increases with n<sup>2</sup>









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🔍 guam internet exchanç >



:: Welcome to Guam Internet Exchange (GU-IX) Website ::

Main ::: About Us ::: Technical ::: Members ::: Locations ::: Contact

::: Members

Company Name ( or DBA )ASNGuam Cablevision / Kuentos CommunicationsAS3605FSM TelecomAS10130ICANN / L.ROOT-SERVERS.NETAS20144

Copyright 2010 Guam Internet Exchange


















You can have a CDN at an IX, if somebody will provide an internet port for it to be able to sync up

## Who pays for the internet port for the CDNs at the IX in the Philippines?







### Traffic IN from ASTI



# global cache

http://www.google.com/doodles/philippines-independence-day-2015



PREGINET

TKEP

Your traffic levels qualify for Google Peering

Your network traffic could be better served through Google Peering

Philippine Research, Education and Government nformation Network



## PREGINET

- Philippine Research, Education and Government Information Network
- Proposed as a DoST project around 1999
- Granted funding around 2000
- Has been running as the only research and education network of the Philippines for the past 14 years





## Problems we address

#### Tracks of all Tropical Cyclones, 1985 to 2005. Colours indicate intensity (yellows to reds = most intense).



http://icfr2013.ex.ac.uk/papers/B1\_Duncan.pdf



Photo credit: onlinehome.us



http://s1.ibtimes.com/sites/www.ibtimes.com/files/styles/v2\_article\_large/public/2013/11/10/ typhoon-1.jpg



http://images.gmanews.tv/v3/webpics/ v3/2013/08/2013\_08\_21\_14\_36\_49.jpg



http://motioncars.inquirer.net/files/ 2014/07/620x413x20140716JB-18.jpg.pagespeed.ic\_.UEhJgIAFKO.jpg 48



#### Orchids Home Subidivision, Santiago, Iligan



## Initiatives

- Deployment and installation of hydrometeorological sensors
- Integration of doppler radar, ground stations, and satellite remotely-sensed data into forecast models
- HPC implementation of Numerical Weather Prediction (NWP) model systems
- Use of 3D LIDAR technology for generation of hazard maps and flood inundation models
- Establishment of a central data archiving facility

### http://embedded.asti.dost.gov.ph/projects

SOLAR PANEL

ULTRASONIC SENSOR

G

GDAT

Tower/ Bridge

Staff Gauge

River









Installation of ASTI Water level Monitoring Apparatus



### http://embedded.asti.dost.gov.ph/projects





Weather Stations
 Stream Gauges
 Rain Gauges
 Tide Levels



PAGASA Doppler Radar Philippine Atmospheric, Geophysical, and Astronomical Services Administration

### Doppler Radar Stations • Aparri, Cagayan Baguio, Mt.Province • Baler, Aurora · Subic, Zambales · Tagaytay, Cavite • Virac, Catanduanes · Mactan, Cebu Hinatuan, Surigao Del SurTampakan, South Cotabato

#### **Doppler Radar System Development**



Doppler Radar System in Subic, Zambales

55



Image credit: climatex.ph



#### Typhoon Haiyan

Typhoon Haiyan was one of 80 to 100 tropical cyclones which develop globally each year. Although many of these form and dissipate over the ocean, a number make landfall and can cause considerable damage to property and loss of life.



What is a tropical cyclone?

A tropical cyclone is the generic term for a low

pressure system over tropical or sub-tropical





#### Transfer of data is done using TEIN-CC's digital SilkRoad



From Germany's weather bureau, we transfer around 15 files (14Mb each) of weather data twice a day

From the MET office of UK, we transfer 2 files (~200Mb each) of weather data, also twice a day

#### LIDAR Derived Digital Surface Model (DSM)

#### Orchid Subdivision, Iligan City

#### LIDAR Derived Digital Terrain Model (DTM)



#### "Hidden rivers"



3D Visualisation of the Flood Model derived using LIDAR data for the Mandulog River, Iligan City. 1 in 100 year event modelled, flood depth shown.





© Image from 1 in 100 year flood model produced by the DREAM-LIDAR component of Project NOAH. Modelled flood depth is shown overlain on the surveyed aerial photo and LIDAR Digital Surface Model.



### Rapid Flood Simulation for Flood Events







Simulated over Office of Civil Defense (OCD) - CSCAND<sub>6</sub>Lidar data

## http://noah.dost.gov.ph



## High Performance Computing (HPC)





### 2015: WHERE WE ARE NOW

Computing and Archiving Research Environment (CoARE)
 Project



66

### 2015: WHERE WE ARE NOW

 Computing and Archiving Research Environment (CoARE) Project



67

### 2015: WHERE WE ARE NOW

 Computing and Archiving Research Environment (CoARE) Project



68

22K

RAPPLER News Video Business Newsbreak MovePH Views Life & Style Entertainment Sports Tech Live BrandRap

## Introducing Diwata, the first Philippine-made satellite

Diwata is one of two micro-satellites the Philippines hopes to launch in 2016 and 2017. It is expected to improve weather forecasting, disaster management, forest protection and other public services.



UP IN SPACE. Diwata, the Philippines' first microsatellite, may look like this, the 1U CubeSat ESTCube-1 which was developed by Estonia. Image from Wikipedia

MANILA, Philippines – The Philippines will launch its very own satellites into space in 2016 and 2017, the Department of Science and Technology (DOST) announced on Tuesday, March 10.

## Philippine Satellite Project

- A ground receiving station will be setup and it will be linked to PREGINET
- The Philippine NREN will be the primary storage facility of the data collected by this infrastructure





PSOC Nt.=55 cat   VILLE Information Technology Center   UPLB Information Technology Center   Home   Search this site:   Gal A and a an		https://itc.uplb.edu.ph:1443/?q=node/161	😭 🔻 ) - 🕞 🕻 debian snmp
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<ul> <li>Search</li> <li>UPLE ITC Online</li> <li>Mone</li> <li>About</li> <li>Services</li> <li>Archive</li> <li>Documents</li> <li>VoIP</li> <li>Calling Manila Using volP</li> <li>Calling Manila Using volP</li> <li>Calling Manila Using volP</li> <li>Colling Manila Using volP</li> <li>Policies</li> <li>UPLB VoIP Directory</li> <li>Ontact Us</li> <li>Autor Portal</li> <li>Wather Portal</li> </ul>		Home	
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About   Services   Archive   Documents   VoIP   Calling Manila Using voIP   VoIP   Calling Manila Using voIP   VoIP Phone User Manual   Policies   Tutorials   VILB VoIP Phone User Manual   VoIP   Contact Us   Vutor Portal   We can now make use of our VoIP phones to call Manila landlines with no additional costs. It is just like calling your neighbor. This was made possible by the generous action of IRRI of letting UP Los Banos share its direct fiber optic connection for non-commercial traffic; thus, creating a direct connection for UP.B. Instead of going through our leased lines (ISP), VoIP calls will pass through the IRRI-UPD link via PREGINET. This feature will save UPLB some money on its official call transactions on Manila area, specially with the UP	UPLB ITC Online	GRAMOSTREAM	
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### Office of the President of the Philippines COMMISSION ON INFORMATION AND COMMUNICATIONS TECHNOLOGY

### MEMORANDUM CIRCULAR No. 01

### Subject: Implementing Rules and Regulations (IRR) of Executive Order (E.O) No. 893 – Promoting the Deployment and Use of Internet Protocol Version 6 (IPv6)

Whereas, pursuant to Section 24, Article II (Declaration of Principles and State Policies) of the 1987 Constitution states that, "The State shall recognize the vital role of communication and information in nation-building";

Whereas, advanced Internet services are now widely used and have become an enabler to social and economic development of all countries, as these services have increased worker productivity and connected local businesses to local and international markets;

### http://www.pregi.net/?dl\_name=IRR\_EO\_893\_MC\_No.\_I.pdf

## IPv6 Summit 2011





Video



### Benigno S. Aquino III, Second State of the Nation Address, July 25, 2011

2011 State of the Nation Address

Senate President Juan Ponce Enrile; Speaker Feliciano Belmonte Jr.; Bise Presidente Jejomar Binay; mga dating Pangulong Fidel Valdez Ramos at Joseph Ejercito Estrada; Chief Justice Renato Corona at ang ating mga kagalang-galang na mahistrado ng Korte Suprema; mga kagalang-galang na kasapi ng diplomatic corps; mga butihing miyembro ng Kamara de Representante at ng Senado; mga Local Government officials; mga miyembro ng ating Gabinete; mga unipormadong kasapi ng militar at kapulisan; mga kapwa ko nagseserbisyo sa taumbayan;

At sa mga minamahal kong kababayan, ang aking butihing mga boss: Continue reading  $\rightarrow$ 

### Benigno S. Aquino III, Second State of the Nation Address, July 25, 2011 (English translation)

Senate President Juan Ponce Enrile; Speaker Feliciano Belmonte Jr.; Vice President Jejomar



### → C ↑ ③ sc.judiciary.gov.ph



Preparing for Bar Examinations and Beyond Syllabus for 2011 Bar Examinations ☆

SMALL CLAIMS

Amended Rule of Procedure for Small Claims Cases Downloadable Forms Small Claims Poster

### RULE OF PROCEDURE FOR ENVIRONMENTAL CASES

A.M. No. 09-6-8-SC Annotation Rationale

MORE >>

SUPREME COURT NEWS

I S 00:00

RECENT DECISIONS

00:00 🕱 4-44

77



## UPLB Graduation 2011 http://graduation.uplb.edu.ph/

- over 500++ simultaneous network connections!
- 30233 unique IPs connected
- ate up almost 100Mbps of outbound traffic

## Network Time Protocol





PAGASA's newly installed atomic clock



**Republic of the Philippines** 

PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION "tracking the sky...helping the country"

### PHILIPPINE STANDARD TIME



Q Search ×  $\nabla$ 

☆ 自 ♥ 0

### www.pregi.net

This is the public mirror service of PREGINET.

Access to the software archives are available via HTTP or FTP.

DISCLAIMER: The use of the facility is at your sole risk and comes with no implied warranty of any kind.

### Index of /

<u>File Name</u> ↓	<u>File Size ↓</u>	Date ↓
<u>CPAN/</u>	-	2015-Nov-28 21:33
Linux/	-	2015-Nov-06 14:35
<u>R/</u>	-	2015-Nov-29 03:13
<u>apache/</u>	-	2015-Oct-28 01:14
<u>centos/</u>	-	2015-Nov-29 03:10
<u>debian/</u>	-	2015-Nov-29 12:23
<u>debian-cd/</u>	-	2015-Sep-09 22:16
epel/	-	2015-Nov-29 01:46
<u>fedora/</u>	-	2014-Nov-12 08:34
<u>gnu/</u>	-	2015-Oct-15 08:25
pub/	-	2015-Oct-28 14:58
<u>rpmfusion/</u>	-	2014-Jul-16 06:46
<u>tex-archive/</u>	-	2015-Nov-28 01:02
<u>ubuntu/</u>	-	2015-Nov-29 05:52
<u>ubuntu-releases/</u>	-	2015-Nov-28 00:40

# Back to internet exchanges

## How we started our IX

## Thank you



Amante Alvaran APNIC



Paul Wilson APNIC



Bill Woodcock PCH



Gaurab Raj Upadhaya PCH



Philip Smith Cisco



Kurt Lindqvist Netnod



Bill Manning USC ISI



Ceejay Dideles ASTI-DOST



### Neutral IX and root server launched at first PHNOG meeting in Manila

APNIC is pleased to be involved with two exciting milestones in the **Philippines** Internet history, which coincided with the first PHNOG (Philippines Network Operators Group) meeting, held in Manila in January, 2007.

The meeting, hosted by the Philippines Advanced Science Technology Institute, was the venue for the launch of a neutral Internet Exchange, and an I root server.

#### **Philippine OpenIX**

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10

Pages

Attachments

Comments

The Philippine OpenIX is the economy's first local common exchange point. Prior to its establishment in January, the four local telcos all operated their own Internet exchanges. The associated peering problems meant that most local Internet traffic was still routed internationally. A cooperative effort involving the Philippines government, PHNOG, local telcos and private enterprise has resulted in the establishment of a neutral Internet Exchange in Makati City. Amante Alvaran, APNIC Training Officer and founding member of PHNOG, had a large involvement with this project.

"This exchange solves many problems faced by Philippines ISPs, such as connectivity issues, high costs, difficulty in obtaining statistics, and restricted access to bandwidth and infrastructure," said Amante.

The concept of a neutral IX was first raised by PHNOG in June 2005. The idea was supported by the Advanced Science Technology Institute (the research arm of the Philippines government Department of Science and Technology - DOST), and the Commission on Information and Communications Technology (CICT). The exchange is co-located with Innove Communications, and is managed and operated by ASTI/DOST. Packet Clearing House, Cisco, and Consulintel have also assisted the project by providing infrastructure.

The Philippine OpenIX is a non-profit, membership-based organisation that is open to all. It is a layer 2 exchange, supporting 10/100/1000Base T, with BGP peering. The membership fee will be waived until December 31, 2007 and the cost will be determined by member consensus.

#### Root server

APNIC, working with ASTI/DOST and Autonomica, provided funding and technical support to enable the installation of the Philippines' first root server. The I root server will improve DNS stability and response time for Internet users in the region. The server was launched on 26 January, and APNIC and ASTI/DOST exchanged Memorandums of Understanding for the server's management.



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 APNIC's Amante Alvaran, who was instrumental in informing PHNOG.

#### PHNOG

Philippines Network Operators Group (PHNOG) is a non-profit organisation established to promote cooperation between network operators in the Philippines.

Similar to other Network Operators Groups (NOGs), PHNOG's main objective is to provide a common forum for Internet technology information dissemination.

PHNOG aims is to enhance the Philippines' participation in the Internet community by enabling and encouraging its members to learn more about policies, network and system issues, and latest technology trends. The organisation also intends to heavily promote the use of IPv6.

In addition to holding two meetings each year, PHNOG's future plans include installing looking glass, network time protocol, and route servers; measuring network traffic and collecting/ reporting statistics; conducting training; and providing IPv6 transit services.

Philippine OpenIX: http://www.phopenix.net

92%

PHNOG:

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84

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http://www.phnog.org

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### First RP 'root server' now live, improves local Net traffic

By Erwin Oliva INQUIRER.net Last updated 04:58pm (Mla time) 06/17/2007



MANILA, Philippines -- The first Philippine root server or "i-root" server run by various non-profit organizations went live just after the May 14 elections, the project coordinator and technical adviser of this project told INQUIRER.net.

Hoping to improve local Internet traffic in the Philippines, the Philippine "i-root" is now part of the Philippine Internet Open Exchange or PHOpenIX network which was launched in January 2007.

The i-root is currently operated by Autonomica from Stockholm, Sweden.

The PHOpenIX is a joint project managed by Advance Science Technology Institute of the Department of Science and Technology, the Philippine Network Operators Group, and the Asia Pacific Network Information Center, which awarded the hosting of the root server.

## First network to peer

# Wilson Chua: A single failure point for the Philippine Internet?

TAS Editor / 5 days ago

A single failure point for the Philippine Internet? by Wilson Chua The Asian Spectator 9 June 2015





# Helps us in bringing in equipment





Marco van den Berg (IRRI)

## BGP Black Magic



## BGP

- Border Gateway Protocol
- The internet is a network of networks, and BGP is the protocol used to exchange bits and bytes between networks
- You need an AS number (we can help here)
- You need a minimum of 256 IPv4 addresses
- /24 IPv4 block

## Membership thru the years

- 2007 8 2012 0
- 2008 I 2013 I
- 2009 3
- 2010 2
- 2011 0

- 2014 11
- 2015 16

42

"directly peered" ASNs

http://www.phopenix.net/members

## How to promote the IX

## How to promote the IX

Network trainings





### Advanced BGP Training July 25, 2014 ASTI Bldg. UP Technopark Complex C.P. Garcia Ave. Diliman, Quezon City



### CAMPUS NETWORK DESIGN AND SECURITY WORKSHOP October 20 - 24, 2014

Advanced Science and Technology Institute Advanced Science and Technology Institute ASTI Bldg., UP TechnoPark Complex.,C.P. Garcia Ave. Diliman, Quezon City NSRC Google

DOST ASTI



# How to promote the IX

- Network trainings
- Network Operator Groups (NOG)

# Philippine Network Operators Group



### **Update from APNIC**

PNIC Regional Meeting, Manila June 2015

Paul Wilson Director General

APNIC

-

13

A

### PHNOG 2015 & APNIC Regional Meeting

Marco Polo Ortigas

100

-1

Organized by:

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# How to promote the IX

- Network trainings
- Network Operator Groups (NOG)
- Look for the peering managers of the networks (or their closest equivalent)

# PeeringDB

<ul> <li>Global System Statistics</li> </ul>	7055
Total Peering Networks	542
Total Public Exchange Points Total Unique Public Exchange Presences	21549
Total Drivate Facilities	1670
Total Unique Private Facility Presences	12752

# How to promote the IX

- Network trainings
- Network Operator Groups (NOG)
- Look for the peering managers of the networks (or their closest equivalent)
- Collaboration with other IXs





# Nepal Internet Exchange (NPIX)

## Gaurab Raj Upadhaya CEO/Tech Chair gaurab@lahai.com wg@npix.net.np





Che-Hoo Cheng





wilson chue

## **AP**NIC

Get IP

Manage IP

### IDSeries: An Open exchange: history of Indonesia's IXP

### By Robbie Mitchell on 26 Aug 2015

Categories: Community, Tech matters

Tags: APJII, IDseries, Indonesia, ISP, IXPs

2 Comments



In early 2000s, Malaysia and the Philippines recognized the success of Indonesia's IXP and sought out Johar's help in creating an IXP for their country.

"Because I was involved in setting up all these IXPs, which are relatively similar, I've always played with the idea of connecting them all."

In 2014, Johar was able to recognize this concept when he first connected the Open IXP to the Philippines IXP and six months later Malaysia's IXP. He says there have been some technical problems but the results are



Johar Alam
 Rangkuti,
 Administrator of
 OpenIXP - Wikimedia
 Commons

https://blog.apnic.net/2015/08/26/an-open-exchange-historyof-indonesias-ixp/
<u>http://www.slideshare.net/apnic/an-</u> <u>experiment-in-connecting-internet-</u> <u>exchanges-between-3-different-countries</u>



# How to promote the IX

- Network trainings
- Network Operator Groups (NOG)
- Look for the peering managers of the networks (or their closest equivalent)Collaboration with other IXs
- Collaboration with other IXs
- Ask APNIC for the AS numbers in your territory, and check each and every WHOIS entry of each and every AS :-D

# Having a Big Brother helps

### "Perceived" current situation of PH internet



#### Gov't urged to remedy slow PHL Internet; PLDT put to task

By BEA MONTENEGRO September 16, 2014 9:13pm



The Philippine government has been called upon to intervene in the sorry state of Philippine Internet infrastructure, with calls for public regulation of local Internet service providers (ISPs)—particularly local telco giant PLDT.

1.207

114

#### Why Internet is slow in PH

By Atom Araullo, ABS-CBN News Posted at 09/16/2014 3:23 PM





Senator Bam Aquino on free IP peering



### Pressure on PLDT to solve PH's slow Internet

At a Senate hearing on the cause of slow Internet connection in the Philippines, discussions focus on mandatory IP peering, a policy that government can't implement because of protests from the telco player



### Gov't mulls making broadband Internet as basic service

Posted on September 17, 2014

**Tweet** 10 8+1 +2 **Pin it** 10 8+1 +2

In order to exercise its power to regulate the telecommunications industry and consequently speed up the "slow and expensive" Internet connection in the country, the government is proposing to reclassify Internet broadband as a basic service rather than a mere value-added service.



### PUBLIC CONSULTATION WITH NTC AND STAKEHOLDERS

Improving Quality Standard of **#PHInternet** 

November 7, 2014 2:00 pm NTC Head Office, NTC Bldg, BIR Road, East Triangle, Diliman, Quezon City

### SEND YOUR QUESTIONS & SUGGESTIONS IN THE COMMENT SECTION! Livestreaming: http://www.phopenix.net/streaming/

Photo: www.ncta.com

**#PHInternet** 





#### **NTC Public Hearing**

#### **PREGINET Broadcaster**



#### **Improving Quality Standard of Philippine Internet**

November 7, 2014 2:00 PM



Committee on Trade, Commerce and Entrepreneurship joint with Public Services





# PH regulator to measure internet service performance

June 08, 2015



The National Telecommunications Commission is close to issuing a memorandum order that will update a previous issuance on minimum speed of broadband connections. But this time, the policy is targeted at measuring internet quality of service over setting minimum standards.



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RESEARCH REPORTS

# Chiz calls on NTC to produce new guidelines for Internet speed, cost

Posted on September 14, 2015



Instead of merely testing Internet speeds, the National Telecommunications Commission (NTC) should conduct an audit to assess the coverage and quality of service of telecommunications companies (telcos) to pressure them into making Internet access faster and cheaper, Sen. Francis "Chiz" Escudero said.







### Grace Poe to youth: Use 'slow' internet to call out govt wrongdoings, rally behind FOI bill

August 12, 2015 4:49pm Tags: gracepoe, internet, foibill

By ROSE-AN JESSICA DIOQUINO, GMA News

Even after hitting the slow pace of internet connection in the country, Sen. Grace Poe on Wednesday called on the youth to use it and their social media "power" to point out the government's failures and triumphs.

At the International Youth Day celebration of the National Youth Commission (NYC), Poe said, "The world is changing with unprecedented speed. Ang mabagal lang ang internet natin."

She pointed out that 45 percent of the world's internet users are below the age of 25 years old.

"In many countries, they have undergone major socio-political developments, young people are shown to be a part, if not the leading movement, for change and challenging the social power structures," Poe said in her speech.



#### Bongbong: Faster Internet should be priority of next administration

Technology from Newsbytes.ph

August 3, 2015 - 08:59 AM

#### Article Highlights:

- Wading into the ICT space, Sen. Ferdinand "Bongbong" R. Marcos Jr. said faster Internet speeds and robust telecommunications systems should be a priority of the next administration.
- With these changes in global commerce, he said the next administration should adopt a mindset where telecommunications, especially the Internet, is part of the Philippines' essential infrastructure.
- Internet metrics provider Ookla found that the Philippines averaged a download speed of just 3.64 megabytes per second (Mbps), which ranked 176th out of 202 countries worldwide.

### PNoy: Too many subscribers, too few services cause of slow Internet speed in PH

Posted on September 8, 2015 by Marcus V



Photo Credit: Philippine Daily Inquirer



- Gov't to investigate snail-paced Internet speed in PH
- Cause could be oversubscribing, little expansion of telco services
- No need to create separate department, DOST can handle the problem

MANILA, Philippines – Amid the outcry over the country's excruciatingly slow Internet speed, President Benigno Aquino said he has directed both the <u>Department of Science and</u> <u>Technology (DOST)</u> and the National Telecommunications Commission (NTC) to look into whether telco companies are over-subscribing Atternet users without expanding their services.

# Output of big brother

### Updates!



### Installed a switch at PLDT Vitro Start : Sept 7, 2015 Ends : Sept 6, 2017

# Updates! Installed a switch at Cebu City

## This is around 580 kilometers from Manila







# Moving forward

- More networks at the Manila switches
- More content (CDNs)
- Setup internet exchanges outside of Manila (i.e. Cebu)
- IP blocks for expansion
- Lobby for donation of more equipment
- More network training
- Become a member of the APIX Assoc.
- BGP communities soon

One guy or one organization will have a difficult time in growing an internet exchange. They need the buy-in of their local community for it to grow.

# http://www.phopenix.net/ pacnog2015.pdf

# bani@asti.dost.gov.ph