Growing the Internet in Myanmar

2nd Into Myanmar IT & Telecoms Summit

3rd – 4th October 2013

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APNIC

Agenda

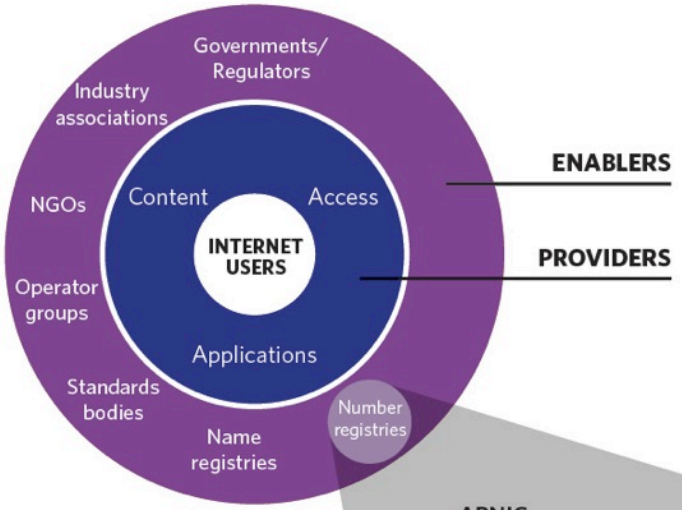
- Who is APNIC?
- Future addressing
- Transit, Peering & IXPs
- Network Operations Groups
- APNIC's support for Internet development

APNIC's Mission

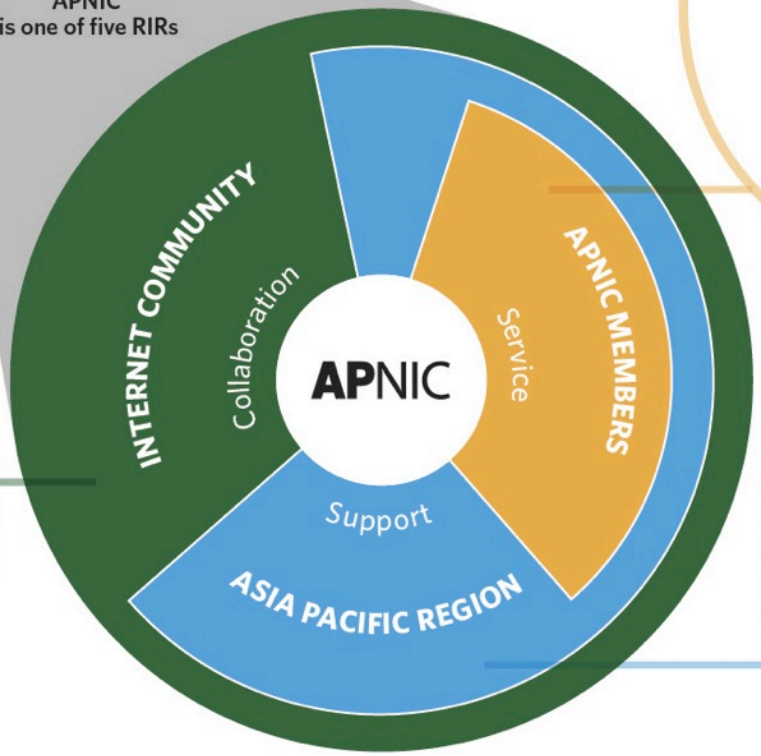
- **Function as the RIR** for the Asia Pacific, in the **service** of the community of Members and others
- Provide Internet registry services to the highest possible standards of **trust, neutrality, and accuracy**
- Provide **information, training, and supporting services** to assist the community in building and managing the Internet
- Support **critical Internet infrastructure** to assist in creating and maintaining a robust Internet environment
- Provide **leadership and advocacy** in support of its vision and the community
- Facilitate **regional Internet development** as needed throughout the APNIC community

APNIC

addressing the Internet in the Asia Pacific



APNIC
is one of five RIRs



Resource distribution
- IP addresses
- AS numbers

Registration services
- reverse DNS
- Internet routing registry
- resource certification
- whois registry

Original research

Data collection and measurements

Publications

Local/regional/global events

Internet governance

Internet security

Policy development

Capacity building
- training
- workshops
- conferences
- fellowships
- grants

Infrastructure
- root servers
- IXPs
- engineering assistance

Internet resources status

- IPv4 addresses:
  - APNIC operating “final /8” policy
  - Each member may receive a **maximum** of **one** /22 (a total of 1024 addresses)
- IPv6 addresses:
  - “unlimited”
  - Each member may receive a **minimum** of **one** /32 (allowing 4 billion discrete subnets)
- Autonomous System numbers:
  - Required for multihomed networks
  - “unlimited”
  - ASN range is 32 bits (allowing 4 billion ASNs)

Existing network infrastructure

- Only /22 of IPv4 space is available from APNIC
- IPv4 Transfers:
  - Some operators exploring IPv4 address transfers from
    - Other APNIC members
    - Outside the Asia Pacific region
  - Costs involved
- IPv6 address space is readily available
  - Many operators now adding IPv6 to their network infrastructure
    - Dual stack is common
    - Translation and other technologies also used

New network infrastructure

- The IPv4 /22 available from APNIC:
  - Only real use now is to provide window into IPv4 world
- New deployment realistically has to use native IPv6
- Two options for IPv6 native:
  - IPv6 native, private address IPv4, with IPv4 NAT
  - IPv6 native, no IPv4, with IPv6 to IPv4 NAT
  - Both techniques used in existing deployments by various operators around the world
- IPv4 NAT has limitations:
  - Scalability, security, performance, offering of services
  - Number of users per IP address

Peering & Transit

- The Internet is a success because network operators **peer** with each other
  - No cost for traffic
  - Takes place between network operators
  - Takes place between **competitors**
  - Peering guarantees a vibrant growing Internet economy
- Private peering
  - Operators interconnect their networks bilaterally
- Public peering
  - Operators participate at an Internet Exchange Point
- Transit
  - Last resort to reach destinations not available by peering

Peering & Transit

- Operators work hard to peer as much as they can
  - Reduces the cost of carrying local traffic over expensive international or transit links
- Operators ensure their transit links are efficient and effective
  - Choosing a transit provider is not just about price
  - But about working with an operator who can provide connectivity and service
- Two transit providers, maximum three only
  - Too many transit providers increases costs of bandwidth
  - Makes traffic engineering harder
  - Reduces manageability of network infrastructure

Internet Exchange Point

- When more than two providers need to peer with each other
  - More cost-effective and efficient to peer in one place
  - Neutral, open access – called IXP
- All Internet economies need an IXP
  - Saving money
  - Improving Quality of Service (latency, jitter, bandwidth)
  - Creating a local Internet economy
- Implementing an IXP – needs to:
  - Be **independent** of any network operator
  - Be **free** to access for any network operator (not just local)
  - Have **no** traffic **charges**

Internet Exchange Point

- Management and operation:
  - By consortium of members or independent party
- Technology:
  - Managed ethernet switch
- Physical:
  - Neutral independent data centre, with room to grow, with good connectivity and access
- Costs:
  - Shared equally amongst all members
  - Covers switch, datacentre, power, environment, operations

Network Operations Community

- A network operations group (NOG) is a forum for ISP technical and operations staff to meet, share ideas, discuss common issues, etc
- Even though network operators compete, technical staff stay in close contact, to handle issues of common interest
- There are many regional and local NOGs
  - SANOG – South Asia
  - NANOG – North America
  - MyNOG – Malaysia
  - NZNOG – New Zealand
  - JANOG – Japan
  - Etc…

APNIC's role

- APNIC assists with developing Internet infrastructure around our service region, via:
  - Education (workshops, e-learning, tutorials)
  - IPv6 outreach (trends, best practices, deployment advice)
  - Engineering Assistance (more detailed work following workshops)
  - DNS Root Nameserver (F-root and I-root deployments at IXPs)
  - IXP infrastructure (encouraging the development of local economy)
  - Network Operations Groups & APNIC Regional Meetings (encouraging more local interaction, support and understanding)
- APNIC partners with organisations such as:
  - NSRC (Network Startup Resource Centre)
  - Local and Regional NOGs

APNIC Training update

- Continuing focus on IPv6 deployment
  - Comprehensive face-to-face and eLearning sessions
  - IPv6 eLearning day (first Wednesday of every month)
- eLearning
  - Every Wednesday in three time zones
  - 23 modules (1-hour duration per module)
  - Free for anyone and everyone who is interested
- Face-to-Face
  - Extensive hand-on exercises
  - Physical and Virtual Training Labs to enable participants to build and configure networks
- Engineering Assistance offered on a cost-recovery basis

training.apnic.net

Training delivered in 2013 (Jan to Aug)

- Face-to-face training
  - 40 courses in 20 locations
  - 1101 participants
- eLearning
  - 66 courses
  - 498 participants

As at 31 August 2013

Summary

- Myanmar has an opportunity to overtake existing Internet economies
  - Little legacy infrastructure or services to support
  - Learn from 20+ years of experiences from other economies
- Internet connectivity is going mobile
  - IPv4 is now legacy protocol for new networks
  - New networks build IPv6 with minimal support to access legacy
- Interconnecting competing networks drives development and a local Internet economy
  - IXP and peering
  - Network Operations Group for a sharing technical community

Thank you!