APTLD Meeting

APNIC's Experience with IPv6

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Overview

- Building APNIC dual-stack network
- Turning on IPv6 services
- Experimental 1400 MTU
- IPv6 services
- Encountered problems

Building APNIC's Dual-Stack Network

- Split /32 into /35s for each POP.
  - Australia, Hong Kong, Japan, US
- Adding IPv6 on IPv4 production network
  - Configured tunnels, native peering on routers
  - Enabled stateless auto-configuration on routers to hand out IPv6 prefixes.
- Set up several VM servers for services testing.

Turning on IPv6 Services

- Work has to be done with extreme caution to avoid disruption on existing IPv4 services.
  1. Enabled IPv6 support on each operating system:
     - Includes assigning static IPv6 addresses
     - Reachability testing – ping6, traceroute6
     - Used 1400 MTU on servers - experimental
     - Configure or turn-off ip6tables
  2. Created separate AAAA RR for troubleshooting.
  3. Individual services reconfigured to listen on IPv6.
  4. Real AAAA RR will be created once IPv6 services are working properly.

Experimental 1400 MTU

- Configured servers to use 1400 MTU
- Most IPv6 takes place over tunnels
- Tunnels impose additional packet header costs
- To ensure IPv6 services are as visible as possible

Turning on IPv6 Services: DNS

Critical services relies on apnic.net NS

1. Adjusted DNS filters allowing local IPv6 hosts.
2. Configured DNS resolver to listen on IPv6 port 53.
3. Configured authoritative NS to listen on IPv6 port 53.
4. DNS query testing from local host, local network, and public network.
5. Added real AAAA/PTR with 5min TTL as precaution:
   - 5min TTL was used to easily remove it from global DNS cache should problem occur.
   - Standard TTL applied once IPv6 services were known to be stable and working for months.

Turning on IPv6 Services: www

1. Reconfigured httpd.conf to support IPv6 http/https request.
2. Tested web services on separate AAAA record while watching access log.
3. Tested http/https queries from different network locations to make sure it's passing through firewalls.
4. Added real AAAA/PTR RR with 5min TTL as precaution
   - ✓ IPv6 enabled host will start sending http/https requests.
5. Used standard TTL when http/https service is stable.

Turning on IPv6 Services: Mail

- SMTP/ASMTP
  1. Enabled IPv6 relaying for local IPv6 hosts.
  2. Created different name with AAAA & PTR.
  3. Turn on MTA support for IPv6:
     - ✓ started sending out mails via IPv6.
  4. Configured to listen on IPv6 port 25:
     - ✓ Allows authenticated IPv6 users to send e-mails.
  5. Created the real AAAA and PTR with 5min TTL.

Turning on IPv6 Services: Mail

apnic.net MX in AU, HK, JP

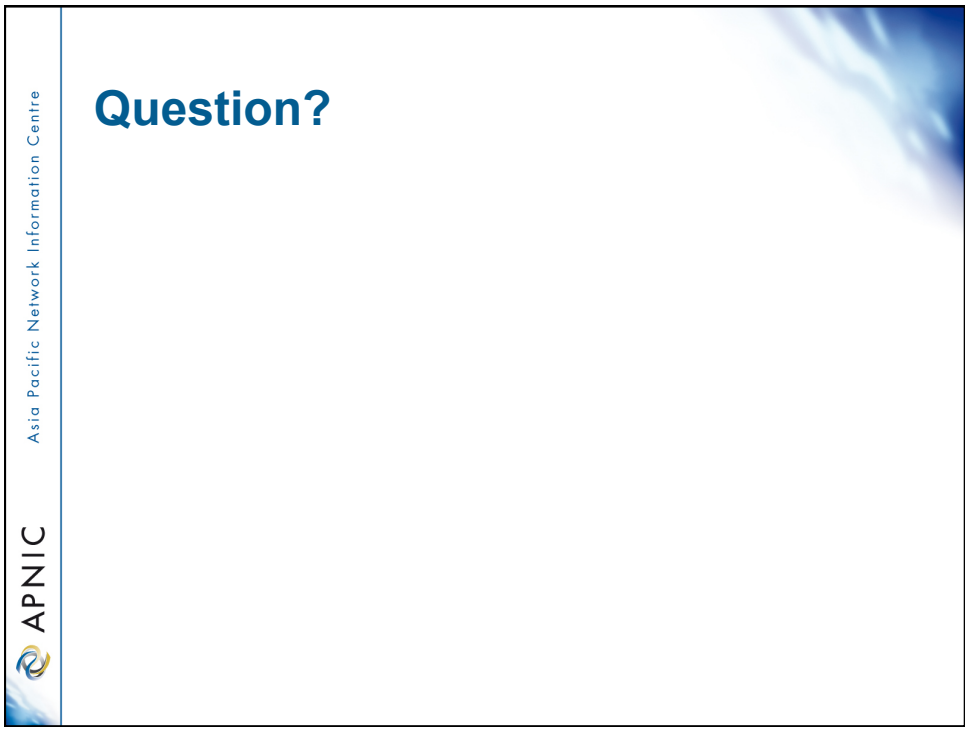
1. Turned on IPv6 support on mail configurations:
   - ✓ Allows relaying mails to local IMAP server via IPv6.
2. Reconfigured to allow local IPv6 hosts relaying and bypass usual e-mail filters.
3. Enabled IPv6 port 25 to receive incoming e-mails from public IPv6 MTAs
4. Created real AAA/PTR with 5min TTL.

IMAP/IMAPS

1. Configured IMAP server to listen on IPv6 port 25:
   - ✓ To receive e-mails from apnic.net MX through IPv6.
2. Configured IMAP to listen on IPv6 port 143/993:
   - ✓ For users to download mails via IPv6.

Encountered problems

- Network filters from different places
- IPv6 failover to IPv4
- SMTP relaying and greylisting
- Mail appliance
- VPN doesn't honour IPv6 - considering alternatives
- Thunderbird e-mail client default is IPv4
- Route filtering – Need to cover /32 announcement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Question?