

Successes and challenges of IPv6 transition at APNIC

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Overview

- Implementing **Dual-stack NAT-PT**
- Challenges and solutions for Dual-stack NAT-PT
- Implementing IPv6-only Wi-Fi
- Challenges and solutions for IPv6-only Wi-Fi



Implementing NAT-PT





#apnic44

Implementing NAT-PT

Each router is configured with a separate range of public addresses for IPv4 inside global addresses

ip nat pool private-lan-pool 203.119.X.X 203.119.X.X netmask 255.255.255.248

ip nat pool private-guest-pool 203.119.X.X 203.119.X.X netmask 255.255.255.248



NAT-PT Challenges

- NAT needed to be done at Site 1, where the clients reside, but the Site 1 routers are not the gateways to the upstream (which is where NAT is usually implemented).
- No NAT was to be done within the organization, thus no translation was to be done between the three sites.



Solution

Using an access list, a route map and a prefix list configuration to filter out all the internal addresses used between the sites so that they are not affected by NAT. All AU prefixes are sorted into group objects. The route map was used to match the access list to the NAT address pool. Finally, the prefix list was used along with OSPF to route the NAT pool to the gateway routers.

ip access-list extended private-lan

deny ip 192.168.X.0 0.0.1.255 object-group apnic_v4

permit ip 192.168X.0 0.0.1.255 any

ip nat inside source route-map guest-map pool private-guest-pool overload

ip nat inside source route-map lan-map pool private-lan-pool overload

NAT-PT Challenges

Users report reconnections at approximately two-minute intervals towards external sites where they were using UDP services.



Solution

• For user reconnections increasing UDP timeout fixed the problem : ip nat translation udp-timeout 28800

Dynamic translations time out after a period of non-use. When port translation is not configured, translation entries time out after 24 hours. This time can be adjusted with the above command



IPv6-only Wi-Fi

• We launched our IPv6-only office Wi-Fi on World IPv6 Day this year.





IPv6-only Wi-Fi

Below is the Logical Diagram





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IPv6-only Wi-Fi

DNS64 server to use Bind9

options listen-on port 53 { any; }; listen-on-v6 { any; }; directory "/var/named"; pid-file "/var/run/named/named.pid"; forwarders { 2001:dc0:2001:11::236; }; version "DNSSEC Resolver"; allow-query { localhost; localnets; apnicnets; }; allow-recursion { localhost; localnets; apnicnets; }; dns64 64:ff9b::/96 {clients { any; };}; }

NAT64 Router for a separate range of public addresses for the NAT64 pool.

IPv6 addresses are provided using SLAAC by the router.



IPv6-only Wi-Fi Success

 The IPv6-only Wi-Fi has been tested using a variety of devices. Laptops, ranging from MacOS Yosemite Sierra machines, Windows 7 and 10 machines, to a mix of Linux distributions and kernel versions, have all worked well for us using this set-up.



IPv6-only Wi-Fi Challenges

 Some mobiles had no problems and could connect and browse, while others did not connect to the network (these devices would display the error 'Obtaining IP Address' and then time out).



How to deal with IPv6-only Wi-Fi Challenges

Enabling Recursive DNS Server (RDNSS) defined in <u>RFC6106</u> on the router. In this set-up, both devices could obtain an IP address and connect to the Internet.

ipv6 nd ra dns server 2001:DD8:9:X::X



Things to watch out for when connecting to different types of servers

- Even though a server may have an IPv6 address, ensure that its services are listening on IPv6.
- We currently have not got Spotify, Skype and Zoom working yet. There are some articles that have pointed to some problems with these applications and IPv6.



So, what does it all mean

 The set-up of IPv6-only is much simpler, requires no special fixes with route maps or prefix lists, and the more that people use IPv6-only, the more vendors will be forced to produce more IPv6-only compatible devices and services.





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