Transition to IPv6: Should ISPs consider it now?

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Overview

• Current status of IPv4 address space
• Current policy discussion on transition
• IPv6 deployment trends
• APNIC IPv6 policies
• Possible steps ISPs could take
Regional Internet Registry (RIR)
Status of IPv4 address space (/8)

- APNIC, 24
- ARIN, 27
- LACNIC, 4
- RIPE NCC, 24
- Central Registry, 94
- IANA Reserved, 48
- Experimental, 16
- Multicast, 16
- Private Use, 1
- Public Use, 1
- AfriNIC, 1
- Experimental, 16
- Multicast, 16
- Private Use, 1
- Public Use, 1
- AfriNIC, 1
- IANA Reserved, 48
IPv4 allocations: RIRs to LIRs/ISPs
Studies in IPv4 exhaustion

- RIRs release statistical data on their allocations
  - [http://www.nro.net/statistics/](http://www.nro.net/statistics/)

- Geoff Huston, chief scientist at APNIC, has studied the IPv4 allocation data
  - Projections based on current and past utilisation rates
  - Three sets of data analysed:
    - IANA allocations to RIRs (IANA IPv4 address registry)
      - Allocation of /8 blocks to RIRs and others
    - RIR allocations to ISPs (RIR statistics files)
      - Allocation of blocks to LIRs
    - ISP announcements (BGP routing table)
      - Amount of address space advertised
Data analysed - IPv4 allocations

http://www.potaroo.net/tools/ipv4/
Data analysed - BGP announcements

Time Series of Advertised and Unadvertised Addresses

- Advertised
- Unadvertised
Data analysed - complete picture
Projection - including all unused pools

*If all IPv4 addresses not in use were reclaimed and re-allocated
Alternative solutions examined

- Recover unused historical IPv4 address space
  - Is the effort to recover worthwhile?
    - De-aggregation
    - Aggressive reclaiming only extend v4 lifetime a few years
    - Legal ramifications
  - Ability to recover is limited under current policies

- Use of Network Address Translator (NAT)
  - Originally designed to extend life of IPv4
    - Cannot cater for large network
  - Road block
    - Peer to peer
    - Security (IPsec)
    - QoS (VoIP and real time video)
Projection - RIR exhaustion point

As of 5 March 2007
Current discussion on transition (policy)

• “IPv4 count down” proposal
  – Proposal seeks consensus on the following points
    • Define last date of allocation
    • Reserve blocks for critical infrastructure
    • Keep current policy framework
    • Recycling of resources to be discussed separately
    • Global coordination
  – http://www.apnic.net/policy/proposals/prop-046-v001.html
  – Will be discussed at other RIR meetings later in the year
IPv6 Deployment Trends
IPv6 allocations: RIRs to LIRs/ISPs
IPv6 allocations: RIRs to LIRs/ISPs

Cumulative Total (Jan 1999 – Mar 2007)

- AfriNIC, 28, 2%
- APNIC, 285, 23%
- ARIN, 233, 18%
- LACNIC, 90, 7%
- RIPE NCC, 629, 50%
IPv6 allocations in AP region

JP, 92
KR, 37
TW, 26
CN, 17
ID, 12
IN, 11
TH, 9
PG, 1
MY, 11
HK, 8
SG, 6
AU, 14
AP, 1
BD, 1
PK, 4
VN, 2
MO, 2
NZ, 10
IPv6 Allocations in AU, NZ & Pacific region

Number of Allocation

Year

1999 2001 2002 2003 2004 2005 2006 2007

Australia

New Zealand

Papua New Guinea
APNIC IPv6 allocation policy

• Initial allocation
  – Criteria
    • Be a Local Internet Registry (LIR)
    • Plan to have 200 customers within 2 years
  – Minimum allocation /32
    • Can use IPv4 customers as justification
APNIC IPv6 portable assignment policies

• Critical infrastructure assignment
  – Root DNS, ccTLD, gTLD, ICANN, RIR and NIR
  – Maximum of /32

• IXP assignment
  – Minimum /48

• Small multihoming assignment
  – Network has at least 2 different external connections
  – Minimum /48
Possible steps ISP could take

• Staff training
  – Send staff to events like PACNOG, APNIC, APRICOT to participate in IPv6 training
  – Request APNIC to conduct IPv6 workshop in your economy
    • Send email to training@apnic.net

• Request for IPv6 allocation/assignment
  – IPv4 and IPv6 networks can co-exist
    • Most IPv4 software and hardware are IPv6 capable
  – No extra fees
    • Existing APNIC members with IPv4 space

• Start a test bed
  • Experiment with IPv6 while providing services in IPv4

• Start now
  – Transition takes time
Possible steps ISP could take (cont)

• Join mailing lists to keep up to date on developments
  – APNIC mailing lists
    • [http://www.apnic.net/community/lists/index.html](http://www.apnic.net/community/lists/index.html)
  – PACNOG mailing list
    • [http://mailman.apnic.net/mailman/listinfo/pacnog](http://mailman.apnic.net/mailman/listinfo/pacnog)
  – IPv6 global operator forum
    • [http://lists.cluenet.de/mailman/listinfo/ipv6-ops](http://lists.cluenet.de/mailman/listinfo/ipv6-ops)

• Access relevant websites
  – Internet Community of Online Network Specialist (ICONS)
    • Keep up to date on operational matters
      • [http://icons.apnic.net/](http://icons.apnic.net/)
  – Global IPv6 forum
    • Latest events and information on IPv6 development
      • [http://www.ipv6forum.org/](http://www.ipv6forum.org/)
APNIC meetings

• APNIC 24, SANOG 10
  – New Delhi, India
  – 29 August - 7 September 2007
• APNIC 25, APRICOT 2008
  – Taipei, Taiwan
  – 25 - 29 February 2008

• All invited !!!

http://www.apnic.net/meetings
Thank you!

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