

Emerging Service Provider Scenarios for IPv6 Deployment

draft-carpenter-v6ops-isp-scenarios-01

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Motivation

- It's several years since the IETF last worked on ISP deployment scenarios
- Since then numerous ISPs have gained real deployment experience
 - and other ISPs have started active planning
- In the last 2 years there has been a real change in ISP requirements
 - Enormous activity in SOFTWARE, BEHAVE etc.
- We believe that it's time for another systematic look at ISP scenarios

Status

- Published a skeleton -00 draft to indicate our intentions (*2009-10-13*)
- Developed and issued a questionnaire to all ISPs willing to answer it (*issued 2009-12, replies through 2010-02-16 analysed*)
- Analyse replies (*-01 draft*)
- *Next: discuss and draw conclusions*

Outline of questionnaire

- Confidentiality wanted?
- General questions about IP service
- Questions about requirements for IPv6 service
- Questions about status and plans for IPv6 service
- Questions about individual IPv6 technology choices

<http://www.cs.auckland.ac.nz/~brian/ISP-v6-QQ.pdf>

Bias

- We got 30 replies, which is good, but we would like more!
 - more replies still welcome through April
- Those who chose to reply were self-selected and we can make no claim of statistical significance or freedom from bias in the results.
- In particular, we assume that ISPs with a pre-existing interest in IPv6 are more likely to have replied than others.

Overview of responses

- 30 ISPs replied
- 66% European ISPs, others from NA and AP
- Commercial ISPs operating nationally predominate
- 30 customers up to 40 million
 - some very large providers chose not to answer about the number of customers

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Basics

- 80% stub + transit, 20% stub only
- 27% offer IP multicast service
- 80% have multihomed customers
- Access technologies:
 - xDSL, DOCSIS, leased line (X.25, TDM/PDH, SDH), frame relay, dialup, microwave, FTTP, CDMA, UMTS, LTE, WiMAX, BWA, WiFi, Ethernet (100M-10G), MetroEthernet/MPLS.
- 87% of ISPs supply CPE to customers
 - IPv6 support in CPE is missing or partial in all cases

IPv4 lifetime

- When will ISPs run out of public address space for their own internal use?
 - Widely varying answers between “now” and “never”
- When will ISPs run out of public address space for customers?
 - Answers between 2010 and 2015 (plus 3 “never”)
- ~40% of ISPs use RFC1918 internally
- ~20% of ISPs offer RFC1918 to customers

IPv6 requirement

- 60% of ISPs report that some big customers are requesting IPv6 already
- When will 10% of your customers require IPv6?
 - 2010 to 2017
- When will 50% of your customers require IPv6?
 - 2011 to 2020
- When do *you* require IPv6 to be a standard service?
 - 2010 to 2015; most common answer = 2011

Crystal ball

- What is your planned date for regular IPv6 service?
 - *latest* date given was 2013
- When will IPv6 be 50% of traffic?
 - the most common answer is 2015

Service status

- 40% of respondents have IPv6 now as a regular service
 - in general it is used by fewer than 1% of customers
- 47% of respondents have IPv6 deployment in progress or planned
 - these all plan at least beta-test service in 2010

Major technology choices

- 93% choose a dual stack routing backbone
 - Reason: KISS
- 40% run/plan a 6to4 relay
- 17% run/plan a Teredo server
- 77% run/plan no equipment dedicated to IPv6
- (a different) 77% do not see IPv6 as an opportunity to restructure topology

Equipment unable to support IPv6

- CPE, CPE, CPE, CPE, CPE, CPE, CPE, CPE, CPE
- Handsets
- DSLAMs
- Routers (including several specific models)
- Traffic management boxes; load balancers
- VPN boxes
- Management interfaces & systems
- Firewalls
- Billing systems.

Can this equipment be field upgraded?

- The answers were gloomy:
 - 5 yes
 - 4 “partially”
 - 10 no
 - Numerous "don't know" or "hopefully".

Prefixes

- The ISPs have prefixes ranging from /19 to /48
- 15 ISPs offer more than one of /48, /52, /56, /60 or /64
- Two offer /56 only, seven offer /48 only
- Two wired operators offer /64 only
- Mobile operators offer /64 in accordance with 3GPP, but at least one would like to be allowed to offer /128 or /126
- 30% of the operators already have IPv6 customers preferring a PI prefix

Service readiness

- 50% of ISPs operate or plan dual-stack SMTP, POP3, IMAP and HTTP
- Internal services:
 - Firewalls, intrusion detection, address management, monitoring, and network management tools are also around the 50% mark.
 - Accounting and billing software is only ready at 23% of ISPs.

IPv4-IPv6 interworking

- 57% of ISPs don't expect IPv6-only customers
 - Mobile operators are certain they will have millions.
 - 5 ISPs report customers who explicitly refused to consider IPv6.
- How long will users run IPv4-only applications?
 - The most frequent answer is "more than ten years".
- Is IPv6-IPv4 interworking at the the IP layer needed?
 - 90% say yes
 - 30% plan NAT-PT or NAT64
 - 23% rely on dual stack
 - the others are in *duh!* space

Mobile services

- Do you have plans for Mobile IPv6 (or Nemo mobile networks),
 - Yes: 20%
 - No: 70%
 - Uncertain: 10%

Finally, some quotes

- "Just do it, bit by bit. It is very much an 'eating the elephant' problem, but at one mouthful at a time, it appears to be surprisingly easy."
- "We are planning to move all our management addressing from IPv4 to IPv6 to free up IPv4 addresses."
- "Customer support needs to be aware that IPv6 is being started in your network, or servers. We experienced many IPv6 blocking applications, applications that do not fall back to IPv4, etc. The most difficult part may be to get engineers, sales, customer support personnel to like IPv6."

Next steps

- That was only some of the information we obtained; please see the draft for more.
- Discussion point: can we extract specific scenarios from all this information?

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