RCS & RDS

Benchmarking Methodology for IPv6 Transition Technologies

draft-ietf-bmwg-ipv6-tran-tech-benchmarking-03

Marius Georgescu

RCS&RDS
IP/MPLS Backbone Department

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DRAFT MOTIVATION: IPV6 TRANSITION

- IPv6 is not backwards compatible
- The Internet will undergo a period through which both protocols will coexist
- Currently only 7% of worldwide Internet users have IPv6 connectivity [1]

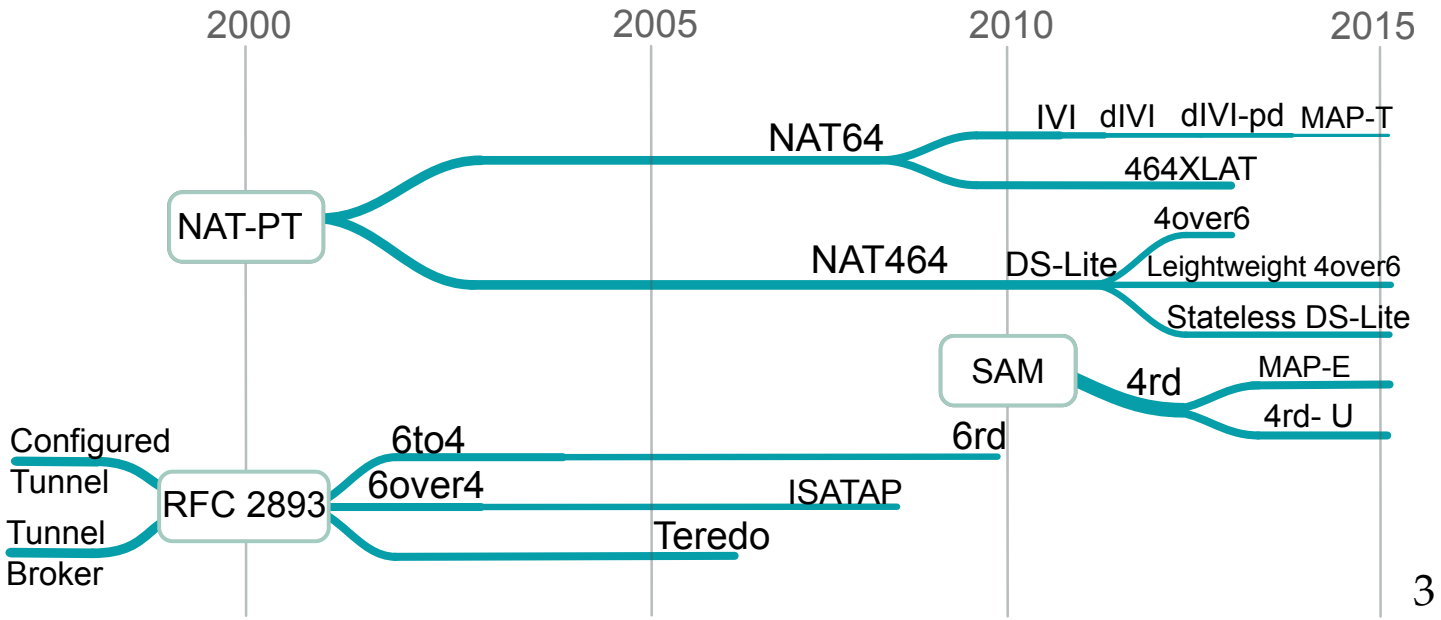
[2]

[1] APNIC. *IPv6 measurements for The World*. Asia-Pacific Network Information Centre, Nov. 2016. URL: http://labs.apnic.net/ipv6-measurement/Regions/.

[2] **Original drawing by Andrew Bell @ www.creaturesinmyhead.com** .

IPV6 TRANSITION TECHNOLOGIES EVOLUTION

- What benchmarks to use?
  - For Dual Stack RFC2544 or RFC5180 are enough
  - How about translation/encapsulation technologies?



[3] **inspired by the APNIC35 presentation "The evolution of IPv6 transition technologies" by Jouni Korhonen.**

GENERIC TRANSITION TECHNOLOGIES ASSOCIATION TABLE

	Generic Category	IPv6Transition Technology
1	Dual-stack	Dual IP Layer Operations [RFC4213]
2	Single translation	NAT64 [RFC6146], IVI [RFC6219]
3	Double translation	464XLAT [RFC6877], MAP-T [RFC7599]
4	Encapsulation	DSLite[RFC6333], MAP-E [RFC7597] Lightweight 4over6 [RFC7596] 6RD [RFC 5569]

DRAFT OVERVIEW

- This draft provides complementary guidelines to RFC2544[4] and RFC5180[5] for evaluating the performance of IPv6 transition technologies
  - generic classification on IPv6 transition technologies → associated test setups
  - calculation formula for the maximum frame rate according to the *frame size overhead*
- Includes a tentative metric for benchmarking scalability
  - scalability as *performance degradation* under the stress of *multiple network flows*
- Proposes supplementary benchmarking tests for *stateful* IPv6 transition technologies in accordance with RFC3511[6]
- Proposes supplementary benchmarking tests for *DNS resolution performance*
  - contributed by Prof. Gábor Lencse [RG profile link]

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[4] S. Bradner and J. McQuaid. *Benchmarking Methodology for Network Interconnect Devices*. United States, 1999.

[5] A. Hamza C. Popoviciu, G. Van de Velde, and D. Dugatkin. *IPv6 Benchmarking Methodology for Network Interconnect Devices*. RFC 5180. Internet Engineering Task Force, 2008.

[6] B. Hickman et al. *Benchmarking Methodology for Firewall Performance*. RFC 3511 (Informational). Internet Engineering Task Force, Apr. 2003. URL: http://www.ietf.org/rfc/rfc3511.txt.

UPDATE OVERVIEW

- Covered the 1st WGLC comments
- Added an intermediary frame size (678 bytes) as representative for production ISP traffic
- Updated the DNS resolution Performance Caching tests (Section 9.2), following the empirical measurements with **dns64perf++ [link]** [7]

[7] G. Lencse and D. Bakai. *Design and implementation of a test program for benchmarking DNS64 servers*. under review: IEICE Transactions on Communications. July 2016. URL: http://www.hit.bme.hu/~lencse/publications/IEICE-2016-dns64perfpp-revised.pdf.

NEXT STEPS

- Comments not covered yet
  - Jacob Rapp's suggestion to include a recommendation for the position of the frame identification tags
  - Current idea: recommend including the tags as identification numbers (a sort of UDP sequence number) in the UDP payload of the frames
- Develop *6transperf*, a draft compliant implementation, before the 2nd WGLC

⋆ Questions for BMWG:

- Were the comments covered well enough?

CONTACT


RCS & RDS
Marius Georgescu
marius.georgescu@rcs-rds.ro
www.ipv6net.ro
IPv6
IPv4