NAT YANG model

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Background

• Draft -00 was published in Sept. 2015
• Has gone through multiple revisions
• Reviewed by NAT experts
  – Other reviews are welcome
• Since BEHAVE and other NAT-related WGs are done, we are presenting in opsawg
Overview

• Supports various NAT flavors
  – Basic NAT (RFC 3022), NAPT (RFC 3022), CGN (RFC6888), NAT64 (RFC 6146), NPTv6 (RFC 6296)
  – Individual port and port set translation schemes

• Covers all the requirements defined in NAT baseline RFCs/BCPs
  – UDP (RFC 4787), TCP (RFC5382), ICMP (RFC 5508), and updates in RFC 7857

• Supports configuration and state management of NAT
Out of Scope

• Dynamic explicit mappings
  – e.g., PCP is defined in a separate document (draft-boucadair-pcp-yang)

• Deterministic NAT assignment scheme
  – Not an IETF standard (RFC7422)

• DSCP-related operations
  – It is tempting to demux NAT mappings by means of DSCP marking ...
  – ..but there is no RFC defining such behavior
  – Further, DSCP re-marking is usually not part of “standard” NAT operations
Dependency: Softwire WG

• A side effect of having “no home” for the NAT YANG document is that draft-ietf-softwire-dslite-yang clones the NAT module
  – We (Softwire) prefer to adopt a clean design in which the NAT module is defined as a separate module
  – DS-Lite YANG will augment it as required
  – softwire wg is chartered to deal with softwires not NAT

• draft-ietf-softwire-yang is also impacted
  – Port-restricted NAT44
What’s Next?

• Consider WG adoption

• If the document is accepted, we will report back to sofwtire wg and update draft-ietf-sofwtwire-dslite-yang & draft-ietf-softwire-yang as follows:
  – ds-lite module will augment the opsawg NAT YANG module
  – Add the opsawg NAT YANG as a normative reference to draft-ietf-softwire-yang

• Questions and suggestions are more than welcome
Backup
IPv6-enabled Network

PC has retrieved an IPv4 address to use to communicate with RM

B4

IPv4-in-IPv6
Outer Header
Src @: 2001:db8::1
Dst @: 2001:db8::2
Inner Header
Src @: 10.2.25.5
Src port: 12345
Dest @: 1.2.3.4
Dest port: 9856

RM

2001:db8::2

IPv4-in-IPv6
Outer Header
Src @: 25.25.65.2
Src port: 9856

IPv4-in-IPv6
Outer Header
Src @: 2001:db8::2
Src port: 9856
Dst @: 2001:db8::1

IPv4-in-IPv6
Outer Header
Src @: 1.2.3.4
Src port: 9856
Dst @: 10.2.25.5
Dest port: 12345

IPv4-in-IPv6
Outer Header
Src @: 1.2.3.4
Src port: 9856
Dst @: 25.25.65.2
Dest port: 4859

Dynamic mapping in "BIB"
{2001:db8::1, 10.2.25.5, 12345} ↔ {25.25.65.2, 4859}

PC checks the mapping table, re-writes the packet accordingly. Encapsulates the packet in an IPv6 one.

AFTR

2001:db8::2

RM

1.2.3.4

IPv4

PC has retrieved an IPv4 address to use to communicate with RM

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Dst @: 2001:db8::2
Inner Header
Src @: 10.2.25.5
Src port: 12345
Dest @: 1.2.3.4
Dest port: 9856

IPv4-in-IPv6
Outer Header
Src @: 1.2.3.4
Src port: 9856
Dst port: 9856

IPv4-in-IPv6
Outer Header
Src @: 10.2.25.5
Dest port: 12345

IPv4-in-IPv6
Outer Header
Src @: 1.2.3.4
Dest port: 9856

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Outer Header
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Inner Header
Src @: 10.2.25.5
Src port: 12345
Dest @: 1.2.3.4
Dest port: 9856

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Outer Header
Src @: 1.2.3.4
Src port: 9856
Dst port: 9856

IPv4-in-IPv6
Outer Header
Src @: 10.2.25.5
Dest port: 12345

IPv4-in-IPv6
Outer Header
Src @: 1.2.3.4
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Dst @: 2001:db8::2
Inner Header
Src @: 10.2.25.5
Src port: 12345
Dest @: 1.2.3.4
Dest port: 9856

IPv4-in-IPv6
Outer Header
Src @: 1.2.3.4
Src port: 9856
Dst port: 9856

IPv4-in-IPv6
Outer Header
Src @: 10.2.25.5
Dest port: 12345

IPv4-in-IPv6
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