SA46T-AT
SA46T Address Translator
draft-matsuhira-sa46t-at-01.txt

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What is SA46T-AT

• SA46T address translator
  – IPv6 - IPv4 header translator using SA46T address
  – Enable IPv6 client - IPv4 server communication
  – Thinking from scratch
  – very specialized, not general purpose
    • Main Target is IPv4 only server, translate to IPv6
    • uni-directional, only support IPv6 clients initiated communication
    • Support specific application, main target is http

• SA46T
  – Stateless Automatic IPv4 over IPv6 Encapsulation / Decapsulation Technology
Network configuration with SA46T-AT

IPv4 only Server

IPv6 Network

SA46T Plane #i
IPv4 global address
10.0.0.10
same IPv4 addr
10.0.0.10
IPv4 only Server

SA46T Plane #j
IPv4 global address
10.0.0.10
IPv4 only Server

ipv4onlyhost10.example-i.com
<SA46T-prefix><Plane#i>:10.0.0.10
IPv6 host

ipv4onlyhost10.example-j.com
<SA46T-prefix><Plane#j>:10.0.0.10

IPv6 host

ipv4onlyhost10.example-i.com
IPv4 global address
10.0.0.10
IPv4 only Server

IPv6 host

ipv4onlyhost10.example-j.com
IPv4 global address
10.0.0.10
IPv4 only Server

IPv6 host
Position of SA46T-AS on RFC6144 scenario

<table>
<thead>
<tr>
<th>Initiate</th>
<th>Target</th>
<th>IPv4</th>
<th>IPv6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>network</td>
<td>network</td>
</tr>
<tr>
<td>IPv4</td>
<td>network</td>
<td></td>
<td>#6 SIIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Internet</td>
<td>#4</td>
</tr>
<tr>
<td>IPv6</td>
<td>network</td>
<td>#5 SIIT</td>
<td>#1 SIIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NAT64?</td>
</tr>
<tr>
<td></td>
<td>Internet</td>
<td>#3 SA46T-AT</td>
<td>#7</td>
</tr>
</tbody>
</table>

SIIT: RFC6145, "IP/ICMP Translation Algorithm"
NAT64: RFC6146, "Stateful NAT64: Network Address and Protocol Translation from IPv6 clients to IPv4 Servers"
1. Mapping IPv4 address to the IPv6 address space
2. Multiplexing IPv4 networks over single IPv6 network by IPv4 network plane ID
SA46T prefix 2001:0DB8:0:46/64

IPv4 only host
ipv4onlyhost10.example.com
(planeID=0x64)
IPv4 addr: 10.0.0.10
SA46T addr:
2001:0DB8:0:46:0:64:10.0.0.10

default router: 10.0.1
require Proxy ARP

SA46T-AT
address pool:192.168.0.0/24
10.0.0.1
2001:0DB8:1::1

IPv6 host
2001:0DB8:1::10

IPv6 host
2001:0DB8:1::10

addr of IPv6 host | SA46T addr mapped IPv4 only host | IPv4 addr mapped to IPv6 host(dyn. assign) | addr of IPv4 only host | entry expire timer
---|---|---|---|---
2001:0DB8:1::10 | 2001:0DB8:0:46:0:64:10.0.0.10 | 192.168.0.200 | 10.0.0.10 | 

Processing from IPv6 to IPv4
1. examine the exists of the entry for IPv6 host
2. If there is no entry, get IPv4 address for mapping of IPv6 host from IPv4 address pool, and make entry to the translation table.
3. IF there is the entry, resolve mapped IPv4 address for IPv6 host

Processing from IPv4 to IPv6
1. Search address translation table with key destination IPv4 address, and resolve corresponding IPv6 address.

Other processing
1. Remove the entry of address translation table if expire

Configuration of SA46T-AT
• SA46T address prefix for route advertisement (2001:0DB8:0:46:0:64:10.0.0.0/120)
• IPv4 address pool for IPv6 hosts
• entry expire default time (TBD)
implementation and experiments

• implementation
  – exists

• experiments
  – Open Router Competition at Interop Tokyo 2012
  – WIDE camp
Relation with NAT64 and SIIT

• SA46T address may apply to the NAT64 and SIIT.  
  – NAT64 work scenario #3 in RFC6144 ?  
  – NAT64 work all scenario in RFC6144 ?  

• SA46T-AT seems SA46T address with SIIT  
  – however RFC6145(SIIT) does not support scenario #3 in RFC6144  

• Does NAT64 and SIIT work with duplicate IPv4 address ?  
  – This condition may exists whether using SA46T address or not.
Working with duplicate IPv4 address

possible same IPv4 address with different plane
Next step

- current I-D is not separating address format (SA46T address) and processing
- Maybe can separate address format (SA46T address) and processing
  - address format is described in RFC6052
    - IPv6 Addressing of IPv4/IPv6 Translators
      - processing: NAT64(RFC6146) and SIIT(RFC6145)
- update I-D
  - separate that, if possible
    - more clear, more organized
- Any comments?
backup slides
NAT64 and SA46T-AT

NAT64

Server (IPv4)

Backbone Network (IPv4)

Clients (IPv6)

default: 64:ff9b::/96

SA46T-AT

Server (IPv4)

SA46T-AT

Backbone Network (IPv6)

Clients (IPv6)