Mapping of Address and Port softwires - IETF83

Design Team Report
Ole Trøan, ot@cisco.com
MAP Design Team

• Formed after the softwires interim meeting in Beijing (2011-10-11)
• “Chartered” to merge the common parts of dIVI-PD and 4rd
  – Algorithmic mapping
  – Provisioning
  – “Features”
• Produced the MAP document series
Members

Tina.Tsou.Zouting@huawei.com
adurand@juniper.net
bingxuere@gmail.com
chunfa.sun@g.softbank.co.jp
cx.cernet@gmail.com
despres.remi@laposte.net
dwing@cisco.com
dxhbupt@gmail.com
fibrib@gmail.com
jacni@jacni.com
jan@go6.si
jouni.nospam@gmail.com
Mohamed.boucadair@orange-ftgroup.com
nejc@skoberne.net
otroan@cisco.com
phdgang@gmail.com
satoru.matsushima@gmail.com
tetsuya@ipinfusion.com
tomasz.mrugalski@gmail.com
wdec@cisco.com
xing@cernet.edu.cn
yong@csnet1.cs.tsinghua.edu.cn
leaf.y.yeh@huawei.com
MAP framework

MAP
Address format
Port mapping algorithm

MAP-DHCP

MAP-E
MAP Address format
MAP Port mapping algorithm
RFC2473

MAP-T
MAP Address format
MAP Port mapping algorithm
RFC6145

Generalized modulus algorithm (GMA)
Documents:

- MAP
draft-mdt-softwire-mapping-address-and-port
- MAP-DHCP
draft-mdt-softwire-map-dhcp-option
- MAP-E
draft-mdt-softwire-map-encapsulation
- MAP-T
draft-mdt-softwire-map-translation
- MAP-DEPLOYMENT
draft-mdt-softwire-map-deployment
Automatic tunnels (RFC1933)

- 6to4 (RFC3056)
- 6rd (RFC5969)
- 6over4
- ISATAP
- Teredo

- NAT-PT
- NAT64
- NAT464

- 6to4 (RFC3056)
- 6rd (RFC5969)
- 6over4
- ISATAP

- MAP
- MAP-DHCP
- MAP-DEPLOYMENT

- A+P

- DS-lite
- Lightweight 4over6
- Stateless DS-lite

- Public 4over6

- dIVI
- dIVI-pd

- XLAT464

- 4rd
- 4rd-(H,U)

- IVI
- dIVI-pd

- MAP
- MAP-T

- MAP-E
Dimensions:

- State at the edge or in the network
- Centralized or Distributed Mapping rules
- NAT placement (CE, PE or both)
- Mesh versus Hub&Spoke
- IPv4 exit vs IPv6 entry mechanism
- Public address “placement” (site or network)
  - Shared IPv4 address, Full IPv4 address, IPv4 prefix
MAP is:

• A solution for provisioning of IPv4 address and static port ranges to CEs.
• Supports full IPv4 address or prefix assignment
• Carry Shared IPv4 address payloads across an IPv6 cloud
• Stateless in the network. Distributed mapping rules.
• Unified solution with 2 flavours, encapsulation mode and translation mode. (Valid reasons for both)
• Implicit address resolution between payload addresses and transport addresses by embedding parts of address/port into IPv6 addresses
Port mapping algorithm

- Port mapping algorithm:
  
  +-----------------------------+
  | A  | PSID (K)     | M  |
  +-----------------------------+

- System ports
- Configurable: Offset (A), Sharing ratio (PSID length)
## Feature buffet

<table>
<thead>
<tr>
<th>Feature #</th>
<th>MAP</th>
<th>4rd-{U,H}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Translation scheme</td>
<td>RFC6145</td>
<td>Header mapping</td>
</tr>
<tr>
<td>Perfect transparency</td>
<td>Encapsulation mode (RFC2473)</td>
<td></td>
</tr>
<tr>
<td>Checksum</td>
<td>Incremental L4 (RFC6145)</td>
<td>CNP</td>
</tr>
<tr>
<td>Interface-id</td>
<td>U-octet (RFC6052)</td>
<td>V-octet</td>
</tr>
<tr>
<td>Well known ports</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Configurable Port range algorithm</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Fragmentation identifier space</td>
<td>Yes (*)</td>
<td>Yes</td>
</tr>
<tr>
<td>Interoperability</td>
<td>NAT64 compatible, Single translation compatible</td>
<td>No</td>
</tr>
<tr>
<td>Max PSID</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Fragmentation reassembly cache</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Configurable subnet id</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Cascading MAP CE</td>
<td>No</td>
<td>Yes(*)</td>
</tr>
</tbody>
</table>
Summary

• MDT is done.
• There are implementations and operational experience.
• We **know** it works
• Working group adoption
  – Document organization:
    • MAP, MAP-{E,T}, MAP-DHCP, MAP-DEPLOYMENT
    • MAP + MAP-DEPLOYMENT