Mapping of Address and Port softwires - IETF83

Design Team Report

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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

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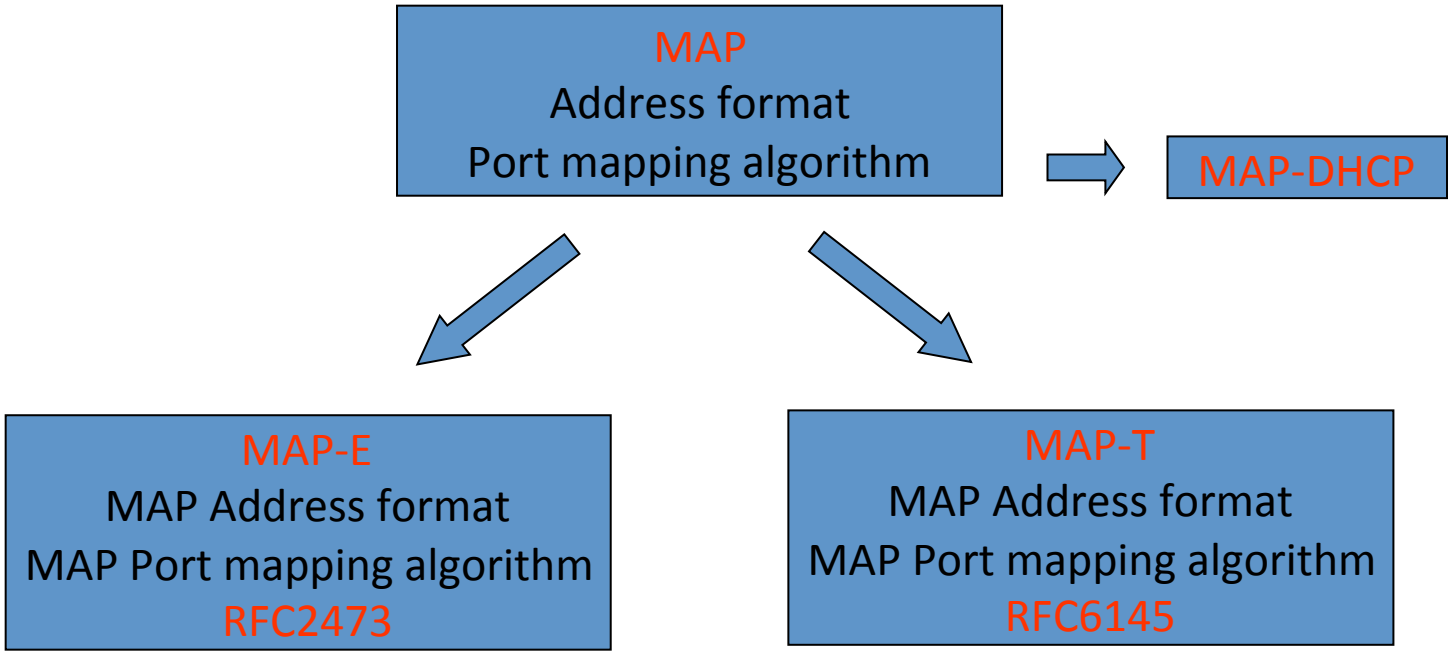
MAP framework



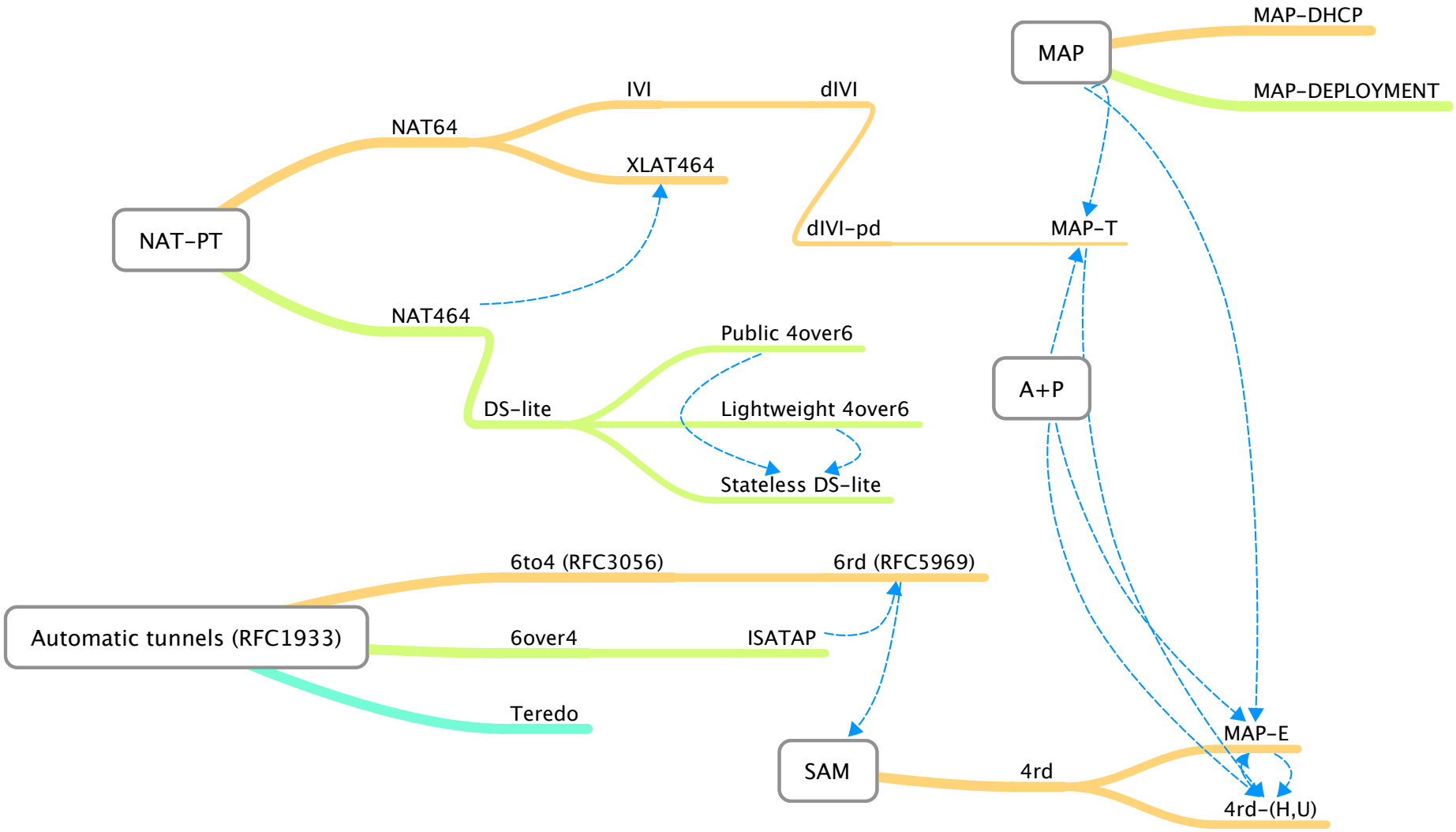

```
<-- n bits -->|<o bits>|<-m bits>|< 8>|<----- L>=32 ----->|<--56-L-->
+-------------+--------+---------+----+--------------+----+---------+
| IPv6 prefix |EA bits |Subnet-id| u  | IPv4 address |PSID|    0    |
+-------------+--------+---------+----+--------------+----+---------+
<End-user IPv6 prefix >|

<---------- 64 ----------------->|< 8>|<----- 32 --->|<----- 24 ---->
+--------------------------------+----+--------------+--------------+
|        BR prefix               | u  | IPv4 address |       0      |
+--------------------------------+----+--------------+--------------+
```

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


MAP
MAP-DHCP
MAP-DEPLOYMENT
MAP-T
A+P
MAP-E
4rd-(H,U)
NAT-PT
NAT64
IVI
dIVI
XLAT464
dIVI-pd
NAT464
Public 4over6
DS-lite
Lightweight 4over6
Stateless DS-lite
Automatic tunnels (RFC1933)
6to4 (RFC3056)
6rd (RFC5969)
6over4
ISATAP
Teredo
SAM
4rd

Dimensions:

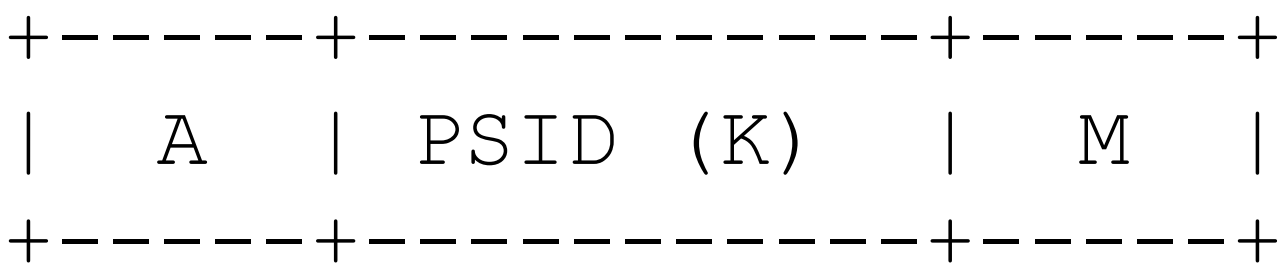
- State at the edge or in the network
- Centralized or Distributed Mapping rules
- NAT placement (CE, PE or both)
- Mesh versus Hub&Spoke
- IPv4 exit vs IPv6 entry mechanism
- Public address “placement” (site or network)
  - Shared IPv4 address, Full IPv4 address, IPv4 prefix

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:



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

Feature buffet

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

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