

Considerations for Mobility Support in NAT-PT
<[draft-lee-v6ops-natpt-mobility-01.txt](#)>

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Abstract

The document specifies considerations for mobility support in NAT-PT ([RFC-2766](#)) [1].

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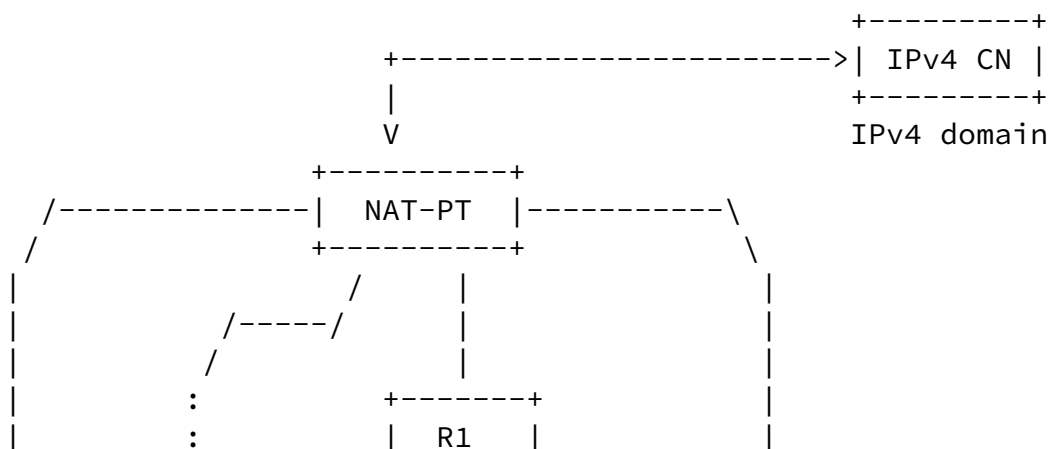
1. Introduction

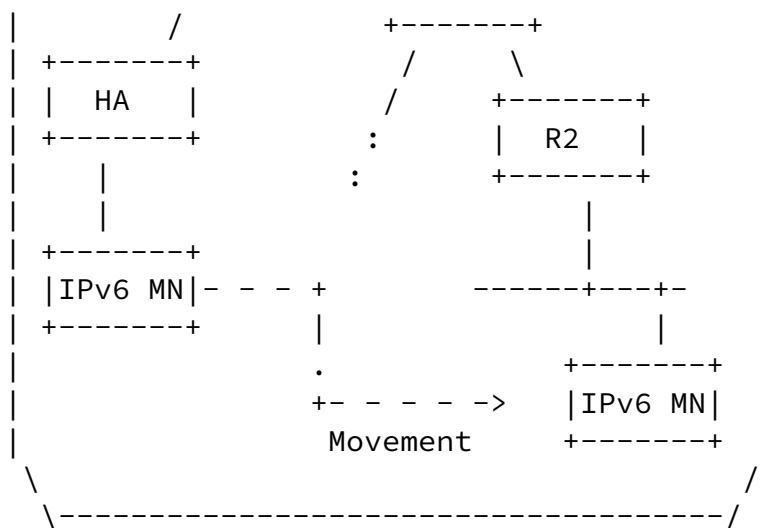
NAT-PT ([RFC-2766](#)) enables end-nodes in IPv6 realm to communicate with end-nodes in IPv4 realm and vice versa. [RFC-2766](#) [1] needs some fixes and/or applicability statements. Among them, there exists considerations in NAT-PT [1] when IPv6 end-nodes move. 3GPP drafts [2, 3] mention that there is a need for translators, such as NAT-PT, but in this case, current [RFC-2766](#) [1] does not support IPv6 mobile nodes. The document specifies considerations for mobility support in NAT-PT ([RFC-2766](#)) [1].

2. Issues with mobility support in NAT-PT

2.1 Movement of end-nodes in IPv6 realm (IPv6-MNs)

When IPv6 end-nodes move, there are issues should be considered in [RFC-2766](#). Basically, since mobile IPv6 (MIPv6) [4] provides route optimization, NAT-PT box must update its associated address mapping entries. As well, NAT-PT box needs appropriate handling of controls such as RR (Return Routability), BU (Binding Update), etc.





IPv6 realm

[2.2](#) Movement of end-nodes in IPv4 realm (IPv4-MNs)

Obviously, there is no issue when IPv4 end-nodes move, since mobile IPv4 (MIPv4)][\[5\]](#) uses tunneling.

[3.](#) Mobility support in NAT-PT box

This section describes the case that an IPv6-MN moves from home network to other network in the same IPv6 island.

Main consideration is that NAT-PT box does all of MIPv6 functionalities on behalf of IPv4-CN's. Following subsections show how NAT-PT box works in this situation.

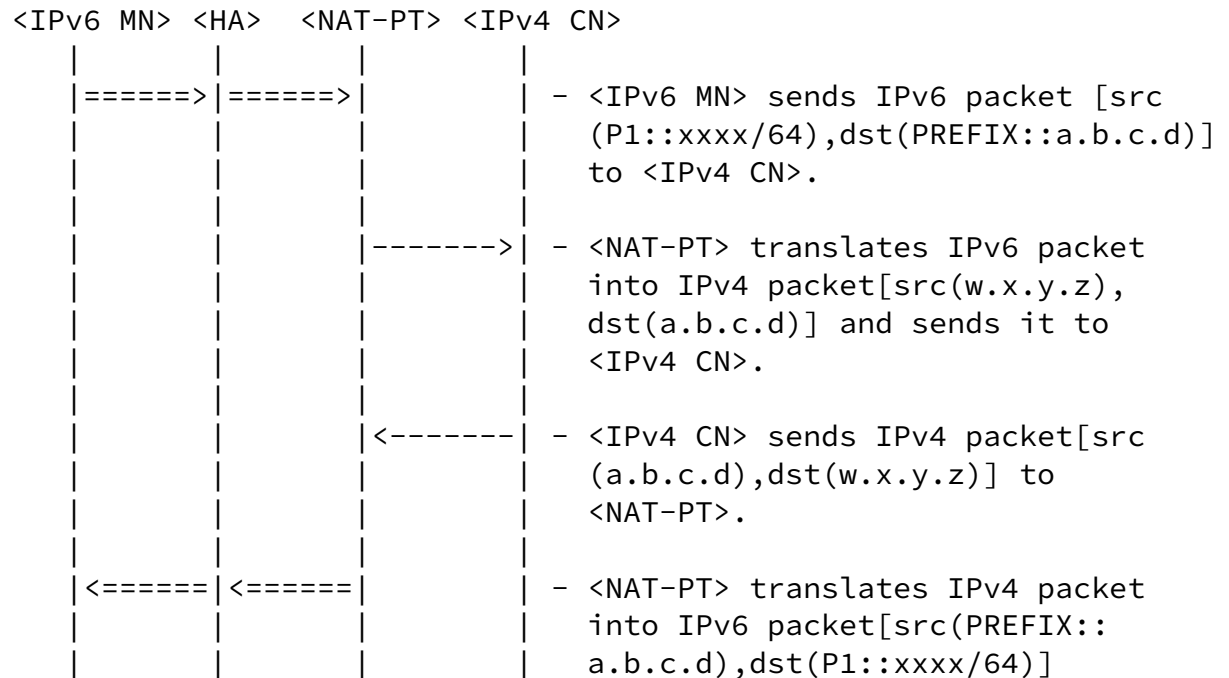
In the example below, the following notations will be used.

- ==> means IPv6 packet.
- > means IPv4 packet.
- ++> means IPv6 over IPv6 tunnel.

[3.1](#) Control Sessions

3.1.1 Initial state

In initial state <IPv6 MN> is in home network and it communicates with <IPv4 CN> like general NAT-PT outbound session.



- ```

* IPv6 MN
 P1::xxxx/64 (Home Address)

* HA
 advertises P1::/64

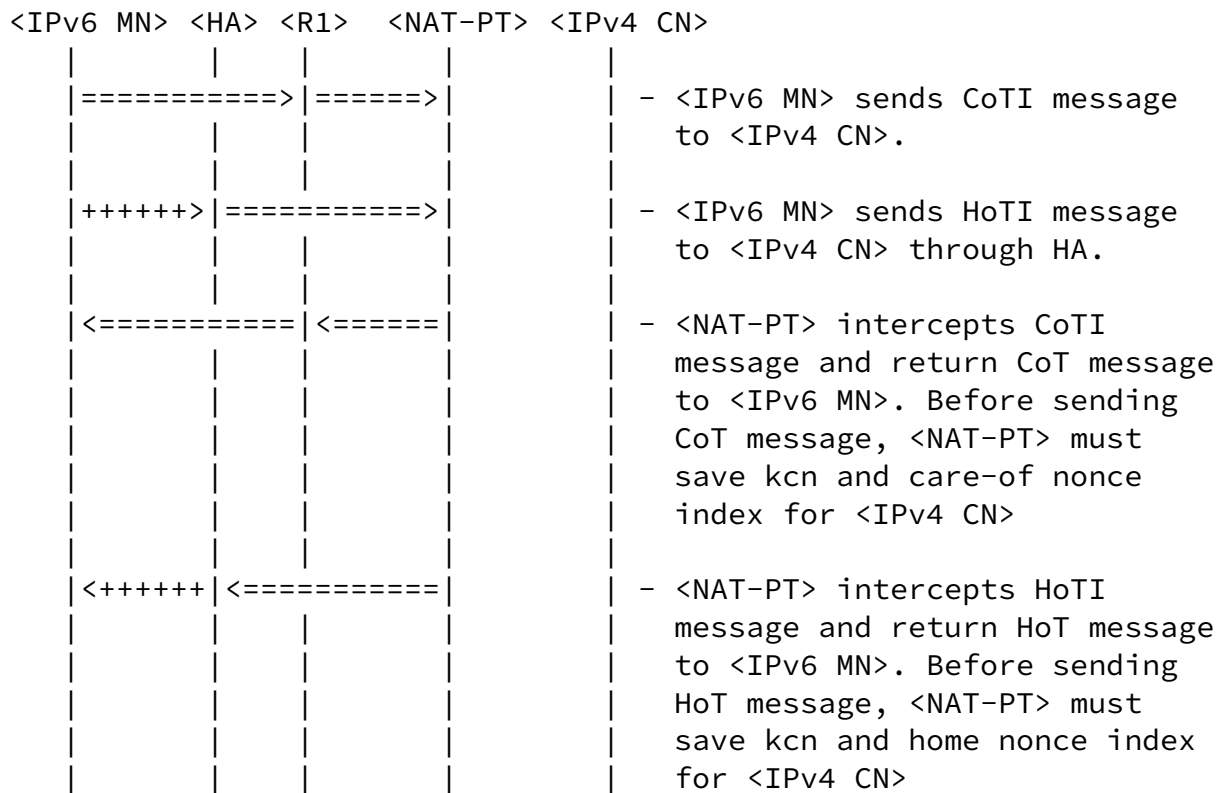
* NAT-PT
 advertises PREFIX::/64
 Mapping Table:
 mapping_entry[0] = {P1::xxxx/64, w.x.y.z}
 Binding Cache Table:
 binding_cache_entry[0] = {}
 Kcn/nonce Table:
 kcn_entry[0] = {}

* IPv4 CN
 a.b.c.d

```

### 3.1.2 RR procedure

After <IPv6 MN>'s moving from home network to other subnet, <IPv6 MN> tries RR procedure to check reachability of <IPv4 CN> before sending BU.



- \* IPv6 MN
  - P1::xxxx/64 (Home Address)
  - P2::xxxx/64 (Care of Address)
- \* HA
  - advertises P1::/64
- \* R1
  - advertises P2::/64

- \* NAT-PT
  - advertises PREFIX::/64

Mapping Table:

```
mapping_entry[0] = { P1::xxxx/64, w.x.y.z }
```

Binding Cache Table:

```
binding_cache_entry[0] = { }
```

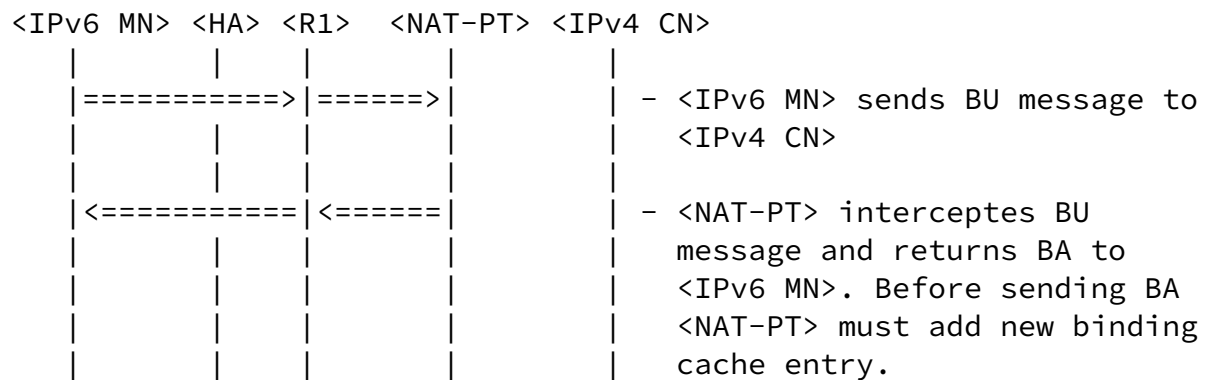
Kcn/nonce Table:

```
kcn_entry[0] = { HA: P1::xxxx/64, COA: P2::xxxx/64,
 CN: a.b.c.d, Kcn: nnn,
 Home Nonce index: nnn,
 Care-of Nonce Index: nnn }
```

\* IPv4 CN  
a.b.c.d

### 3.1.3 Binding Update/Acknowledge

After finishing RR procedure <IPv6 MN> makes authenticator and sends BU message to <IPv4 CN> for route optimization.



\* IPv6 MN

P1::xxxx/64 (Home Address)

P2::xxxx/64 (Care of Address)

\* HA

advertises P1::/64

\* R1

advertises P2::/64

\* NAT-PT

advertises PREFIX::/64

Mapping Table:

```
mapping_entry[0] = { P1::xxxx/64, w.x.y.z }
```

Binding Cache Table:

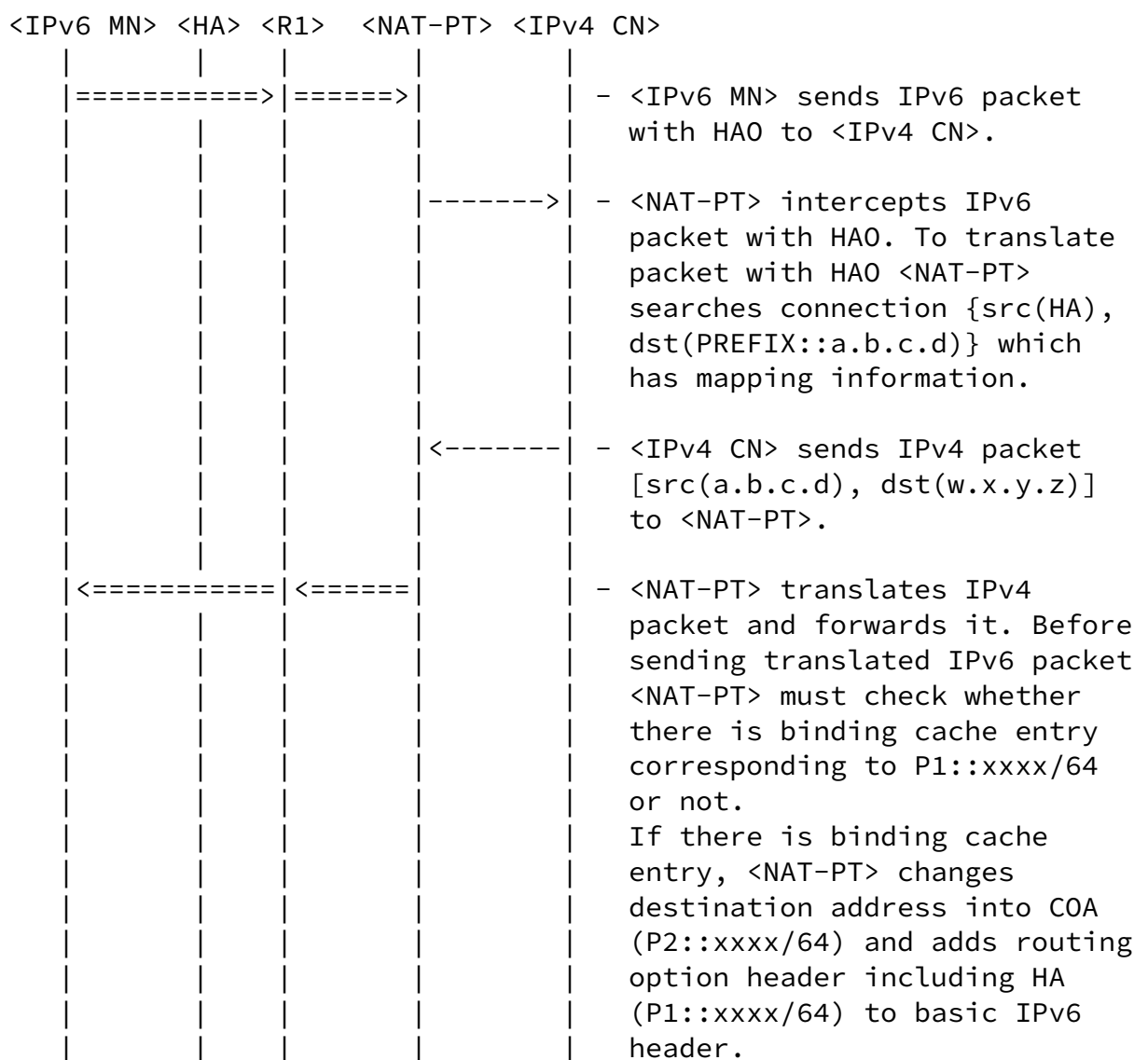
```
binding_cache_entry[0] = { HA: P1::xxxx/64,
 COA: P2::xxxx/64,
 Lifetime: nnn, Flag: 0,
 Seq no: nnn, Usage info: nnn }
```

Kcn/nonce Table:

```
kcn_entry[0] = { HA: P1::xxxx/64, COA: P2::xxxx/64,
 CN: a.b.c.d, Kcn: nnn,
 Home Nonce index: nnn,
 Care-of Nonce Index: nnn }
```

\* IPv4 CN  
a.b.c.d

### 3.2 General Data Transimission



\* IPv6 MN  
P1::xxxx/64 (Home Address)  
P2::xxxx/64 (Care of Address)  
\* HA

```

 advertises P1::/64
* R1
 advertises P2::/64
* NAT-PT
 advertises PREFIX::/64
 Mapping Table:
 mapping_entry[0] = { P1::xxxx/64, w.x.y.z }
 Binding Cache Table:
 binding_cache_entry[0] = { HA: P1::xxxx/64,
 COA: P2::xxxx/64,
 Lifetime: nnn, Flag: 0,

```

```

 Seq no: nnn, Usage info: nnn}
 Kcn/nonce Table:
 kcn_entry[0] = { HA: P1::xxxx/64, COA: P2::xxxx/64,
 CN: a.b.c.d, Kcn: nnn,
 Home Nonce index: nnn,
 Care-of Nonce Index: nnn }
* IPv4 CN
 a.b.c.d

```

#### [4.](#) IPv6-MNs move from one island to another island

This issue should be also considered. This version of the draft is not mentioned yet.

#### [5.](#) Security Considerations

Security consideration is not studied yet.

#### [8.](#) Acknowledgments

Authors would like to acknowledge the idea sharing contributions by Hee Cheol Lee and for detailed comments by KyeongJin Lee on this document.



## Normative References

- [1] Tsirtsis, G. and P. Srisuresh, "Network Address Translation - Protocol Translation (NAT-PT)", [RFC 2766](#), February 2000.
- [2] J. Soinen (ed.), "Transition Scenarios for 3GPP Networks", [draft-ietf-v6ops-3gpp-cases-03](#), March 2003 (Work-in-Progress).
- [3] J. Wiljakka (ed.), "Analysis on IPv6 Transition in 3GPP Networks", [draft-ietf-v6ops-3gpp-analysis-03](#), March 2003 (Work-in-Progress).
- [4] D. Johnson, C. Perkins and J. Arkko, "Mobility Support in IPv6", [RFC-3775](#), June 2004.
- [5] C. Perkins, Ed., "IP Mobility Support for IPv4", [RFC 3344](#), August 2002

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