IPv4 address is estimated to run out shortly. So as [I-D.durand-v6ops-natv4v6v4] stated, we have to consider IPv6 only node for smooth transition. On the other hand, IETF have deprecated the NAT-PT with some reasons. And now we need to seek alternative solutions. Before talking specific technology, we need to consider overall strategy for translation technology.
Table of Contents

1. Introduction .................................................. 3
  1.1. Requirements Language .................................. 3
2. The Devices we have to take care .............................. 3
3. Translators in the market ................................... 3
4. Translators in the future ................................... 3
5. Proposal strategy ............................................ 4
  5.1. Current translator model description .................... 4
  5.2. New translator model specification ....................... 4
  5.3. Common translation rule .................................. 4
  5.4. Translator unfriendly environment ....................... 4
6. Acknowledgements .............................................. 5
7. IANA Considerations ........................................... 5
8. Security Considerations ....................................... 5
9. Normative References ......................................... 5
  9.1. Normative References .................................... 5
  9.2. Informative References ................................... 6
Author’s Address .................................................. 6
Intellectual Property and Copyright Statements .................. 7
1. Introduction

This memo will present an overlooking view on IPv6 deployment and some of the necessary technologies to achieve it.

1.1. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

2. The Devices we have to take care

As [I-D.durand-v6ops-natv4v6v4] stated, it is estimated that IPv4 address exhaustion coming sooner, as early as 2010. So, preparation is required by then. In that time, there would be IPv4 devices and IPv6 devices. And the IPv6 devices can consist of current type and new type. The new type means some devices which can co-exist translator very well (e.g., as proposed by [I-D.carpenter-shanti] and [I-D.beijnum-modified-nat-pt]). The current type means some devices that does not care about translator (e.g., can not distinguish translated address from native address). Also we could not expect to modify current IPv4 devices to adopt the environment using translator.

3. Translators in the market

As described in [RFC4966], NAT-PT has some problems. On the other hand, there are some translator product in the market. They have already known the problem of NAT-PT and have devised to be useful although there are not well working standard translator specification. It may not be the perfect solution but the products can satisfy some requirements.

4. Translators in the future

There are some proposals for translation technology like [I-D.carpenter-shanti] and [I-D.beijnum-modified-nat-pt]. Some of them could require some modification on IPv6 devices to work with translator nicely. It is desired approach to resolve most issues listed on [RFC4966]. The important point here is design based on the requirements.
5. Proposal strategy

Considering above mentioned situation, the new translators might not be the solution for 2010. Of course we know that current of-the-shelf translator would not be the final solution in long term view. But both are important to support smooth and rapid IPv6 deployment.

5.1. Current translator model description

The current translation technology would help smooth IPv6 introduction around 2010. But it may not be the perfect solution. So we should know the current technology. And we should consider what kind of technology fits what kind of situation. And we should give recommendation how to use it. The big advantage of this kind of document is not-keeping users and developers waiting for the definition of new translation technology. This kind of document should be BCPs.

5.2. New translator model specification

As we realized that translator is required. But current technology may not be the perfect solution. So we need to define the specification to resolve issues listed on [RFC4966]. The big advantage of this kind of document is providing safety and optimization. This kind of document would be RFCs.

5.3. Common translation rule

In chapter 3 and 4 of [RFC2765](SIIT), there are translation rule. It is referred by NAT-PT, obsoleted by [RFC4966], and other implementations may be compliant with the rule, since it is reasonable and common rule. It is useful to have such kind of documents. But now the ICMPv6 specification is revised by [RFC4443]. The translation rule should be updated. This kind of documents should be independent from specific translation technology. Especially, the common translation rule for ICMP message is very important.

5.4. Translator unfriendly environment

In IPv4 network, it is observed that some devices transmits IPv4 packet with value "1" in DF Field. And some filtering systems in IPv4
network drop the ICMP error message. This combination makes 
communication failure as follows.
When a translator translates the packet from IPv4 packet to IPv6 
packet, the packet size is increased by the differences of IP 
headers. So, when the Path MTU from translator to IPv6 destination is 
1500 octets, the IPv4 packet with the size of 1500 octets can not 
arrive at the IPv6 destination node. In this case, the intermediate 
routers, include the translator, send ICMP Error Message, Destination 
Unreachable(packet too big), but the message can not arrive at the 
original IPv4 sender due to intermediate filtering system. Then the 
IPv4 node can not learn the Path MTU.
This problem is not only translator problem and happens in general. 
But, documenting this kind of issues should be helpful to provide the 
interoperability between IPv4 node and IPv6 node.

6. Acknowledgements  
Send the author comments if you want your name listed here.

7. IANA Considerations  
This memo includes no request to IANA.

8. Security Considerations  
Security issues associated with NAT have long been documented. 
This memo itself has no security issue.

9. References
9.1. Normative References
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate 
  (SIIT)", RFC 2765, February 2000.
- [RFC4966] C. Aoun, E. Davies, "Reasons to Move the Network Address 
- [RFC4443] A. Conta, S. Deering, M. Gupta, Ed., "Internet Control 
  Message Protocol (ICMPv6) for the Internet Protocol 
9.2. Informative References

[I-D.carpenter-shanti]
Carpenter, B., "Shimmed IPv4/IPv6 Address Network Translation Interface (SHANTI)",
draft-carpenter-shanti-01 (work in progress),
November 2007.

[I-D.durand-v6ops-natv4v6v4]
Durand, A., "Non dual-stack IPv6 deployments for broadband providers",
draft-durand-v6ops-natv4v6v4-01
(work in progress),
February 2008.

[I-D.beijnum-modified-nat-pt]
I. van Beijnum, "Modified Network Address Translation - Protocol Translation",
draft-van-beijnum-v6ops-mnat-pt-00 (work in progress),
February 2008.

Author’s Address
Hiroshi Miyata
Yokogawa Electric Corporation
2-9-32 Nakacho, Musashino-shi,
Tokyo, 180-8750
JAPAN
Email: h.miyata@jp.yokogawa.com
Full Copyright Statement

Copyright (C) The IETF Trust (2008).
This document is subject to the rights, licenses and restrictions
contained in BCP 78, and except as set forth therein, the authors
retain all their rights.
This document and the information contained herein are provided on an
"AS IS" basis and THE CONTRIBUTOR, THE ORGANIZATION HE/SHE REPRESENTS
OR IS SPONSORED BY (IF ANY), THE INTERNET SOCIETY, THE IETF TRUST AND
THE INTERNET ENGINEERING TASK FORCE DISCLAIM ALL WARRANTIES, EXPRESS
OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE
OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED
WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Intellectual Property

The IETF takes no position regarding the validity or scope of any
Intellectual Property Rights or other rights that might be claimed to
pertain to the implementation or use of the technology described in
this document or the extent to which any license under such rights
might or might not be available; nor does it represent that it has
made any independent effort to identify any such rights. Information
on the procedures with respect to rights in RFC documents can be
found in BCP 78 and BCP 79.
Copies of IPR disclosures made to the IETF Secretariat and any
assurances of licenses to be made available, or the result of an
attempt made to obtain a general license or permission for the use of
such proprietary rights by implementers or users of this
specification can be obtained from the IETF on-line IPR repository at
The IETF invites any interested party to bring to its attention any
copyrights, patents or patent applications, or other proprietary
rights that may cover technology that may be required to implement
this standard. Please address the information to the IETF at
ietf-ipr@ietf.org.

Acknowledgment

Funding for the RFC Editor function is provided by the IETF
Administrative Support Activity (IASA).