Network Working Group   M. Xu
Internet-Draft   C. Xia
Intended status: Experimental   X. Li
Expires: January 7, 2010   Y. Cui
                                                              J. Wu
                                                Tsinghua University
                                                       July 6, 2009

IVIT(IVI+Tunnel)
draft-xu-behave-ivit-00

Status of this Memo

   This Internet-Draft is submitted to IETF in full conformance with the
   provisions of BCP 78 and BCP 79.

   Internet-Drafts are working documents of the Internet Engineering
   Task Force (IETF), its areas, and its working groups. Note that
   other groups may also distribute working documents as Internet-
   Drafts.

   Internet-Drafts are draft documents valid for a maximum of six months
   and may be updated, replaced, or obsoleted by other documents at any
   time. It is inappropriate to use Internet-Drafts as reference
   material or to cite them other than as "work in progress."

   The list of current Internet-Drafts can be accessed at
   http://www.ietf.org/ietf/1id-abstracts.txt.

   The list of Internet-Draft Shadow Directories can be accessed at
   http://www.ietf.org/shadow.html.

   This Internet-Draft will expire on January 7, 2010.

Copyright Notice

Abstract

   This document proposes a mechanism, IVIT (IVI+Tunnel), to support
   non-IVI IPv6 hosts to communicate with IPv4 hosts, and vice versa.
   IVIT combines IVI translation and Tunnel methods with the IVI
   translation at the core and the tunnel at the edge. In this
   document, IVIT provides two modes. One is the dual-stack host mode,
   which supports the communication between a dual-stack host in an IPv4
   network and a non-IVI IPv6 host, especially the communication
   scenario between a dual-stack server in an IPv4 network and a non-IVI
   IPv6 host. The other is the CPE mode, which supports the
   communication between an IPv4-only host and a non-IVI IPv6 host,
   especially the bidirectional communication scenario between a private
   IPv4 network and a non-IVI IPv6 network. Combined with IVI, IVIT can
   support the communication between IPv4 networks and IPv6 networks
   statelessly at the core.

Table of Contents

1. **Introduction**

   IVI[1] is a simple and stateless translation mechanism for resolving
   the communication problem between an IPv6 network and an IPv4
   network. In IVI, address translation and protocol translation are
   adopted. In the address translation, IVI defines an address mapping
   rule, as shown in Figure 1, where bits from 32 to 39 are all
   identifiers of IVI, and bits from 40 to 71 are embedded global IPv4
   space. Because the mapping is 1-to-1 mapping, IVI is stateless and
   has the feature of end-to-end address transparency. The protocol
   translation in IVI obeys SIIT[2].

```
    | 0                     |32 |40                  |72            127|
     ------------------------------------------------------------------
    |                       |FF |                    |                 |
     ------------------------------------------------------------------
    |<-  IPv6 prefix  ->|    |<-  IPv4 address   ->|<- zero padding ->|
```
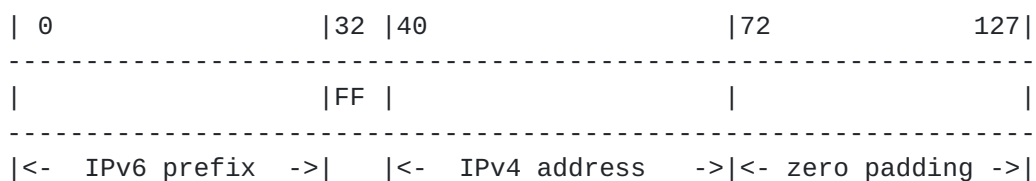
   Figure 1: IVI Address Mapping Rule

   IVI is simple and scalable. In IVI, the communication between the
   IPv4 network and the IVI IPv6 network is stateless. But IVI can't
   support the stateless communication between the non-IVI IPv6 network
   and the IPv4 network.

   NAT-PT[3] can support the stateful communication between the non-IVI
   IPv6 network and the IPv4 network. However, NAT-PT has been
   obsolete. The Non-IVI IPv6 networks account for a large proportion
   of the total IPv6 networks. So providing a simple method to
   communicate between a non-IVI IPv6 network and an IPv4 network is
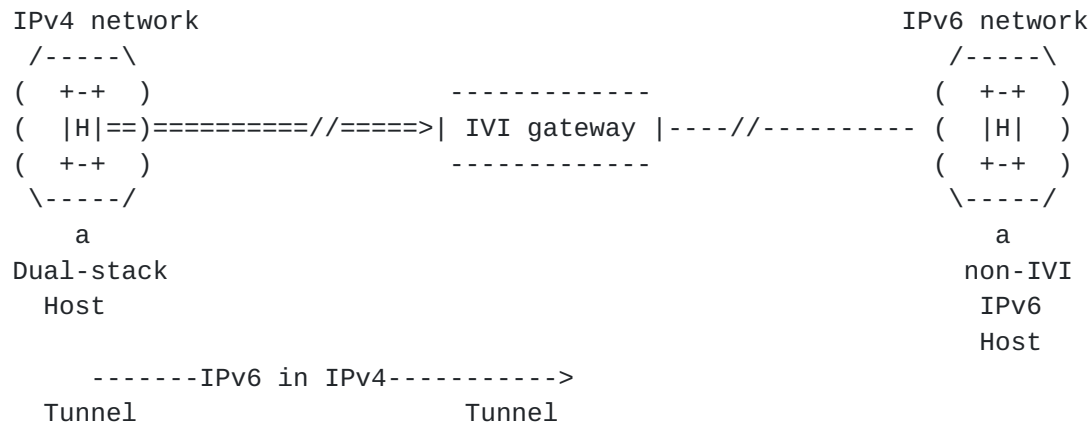   important.

   In this document, IVIT (IVI+Tunnel) mechanism is proposed for
   supporting the communication between a non-IVI IPv6 network and an
   IPv4 network.

   The basic idea of IVIT is the combination of IVI and Tunnel, which
   mixes IVI address mapping rule, ISATAP[4] tunnel mechanism and 6to4
   [5][6]tunnel mechanism together. IVIT has two modes. One is dual-
   stack host mode, in which IPv4-only hosts are upgraded to dual-stack
   hosts which can support encapsulation and decapsulation. The dual-
   stack host mode mainly borrows the idea from ISATAP tunnel mechanism
   to construct the IPv6 in IPv4 tunnel between the dual-stack host in
   an IPv4 network and the IVI gateway. The other is CPE mode. In this
   mode, CPEs are upgraded from IPv4 only to dual-stack, and support
   encapsulation/decapsulation and address mapping. The CPE mode uses

the 6to4 tunnel mechanism for reference to construct the tunnel
between the CPE and the IVI Gateway. Whichever mode, the IVI Gateway
has no change in the address and protocol translation. Of course,
IVI gateway needs to support tunnel encapsulation and decapsulation.
So IVIT is stateless at the core.

2. Dual-Stack Host Mode

2.1. Basic Idea of the Dual-Stack Host Mode

```
  IPv4 network                                              IPv6 network
   /-----\                                                   /-----\
  (   +-+   )                    -------------              (   +-+   )
  (   |H|==)=========//=====>| IVI gateway |----//---------- (   |H|   )
  (   +-+   )                    -------------              (   +-+   )
   \-----/                                                   \-----/
      a                                                         a
   Dual-stack                                                 non-IVI
     Host                                                       IPv6
                                                                Host

         -------IPv6 in IPv4----------->
     Tunnel                      Tunnel


   IPv6 in IPv4 Tunnel between the dual-stack host
   in an IPv4 network and the IVI gateway
```

Figure 2: Dual-stack host mode

Figure 2 shows the basic idea of the dual-stack host mode. If a
dual-stack host in an IPv4 network communicates with a non-IVI IPv6
host, the dual-stack host firstly constructs the IPv6 packets where
the Src address is local IPv6 address and the Dst address is the IPv6
address of the non-IVI IPv6 host. For transmitting the IPv6 packets
over the IPv4 network, the IPv6 in IPv4 tunnel is built with the IVI
gateway and the dual-stack host as its endpoints. The IPv6 packets
are encapsulated into the IPv4 packets, which arrive at the IVI
gateway and are decapsulated into the IPv6 packets. The IVI gateway
forwards the IPv6 packets to the non-IVI IPv6 host. The reverse
communication is similar.

2.2. The IPv6 Address Format of the Dual-stack Host

In IVIT, we still use the IVI address mapping rule to assign or
configure the IPv6 address of the dual-stack host. But we change the
eight bits from 32 to 39 for differentiating IVI feature into eight
zeros to identify IVIT mapping, as shown in Figure 3. During the
communication, we can distinguish the IPv4 address from the IVI
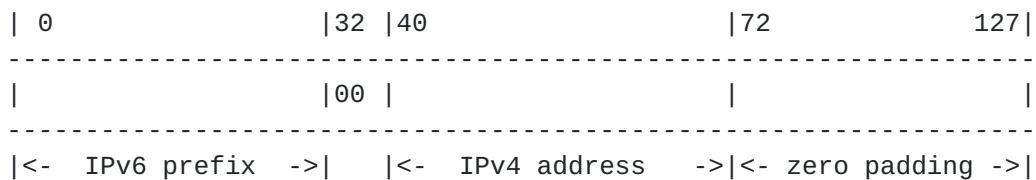address.

```
| 0                    |32 |40                     |72          127|
 ----------------------------------------------------------------------
|                      |00 |                       |               |
 ----------------------------------------------------------------------
 |<-   IPv6 prefix  ->|   |<-  IPv4 address   ->|<- zero padding ->|
```

Figure 3: The IPv6 address format of the dual-stack host

2.3. Upgrade of an IPv4 Host

If an IPv4-only host wants to communicate with a non-IVI IPv6 host,
it must upgrade to a dual-stack host. In the dual-stack host, the
IPv6 address is assigned or configured as 2.2 format, so we can
extract the IPv4 address from the IPv6 address to build the IPv6 in
IPv4 tunnel automatically. In this mode, the modified host may
construct the IPv6 packets. Meanwhile, it must support
encapsulation/decapsulation in order to build the tunnel between the
dual-stack host and the IVI gateway.

2.4. Application Scenarios

The dual-stack host mode mainly supports the application scenarios of
a non-IVI IPv6 host accessing a dual-stack server. Giving an IPv4-
only server in an IPv4 network, the server might be accessed by all
IPv6 hosts if upgraded into dual-stack host mode. Of course, the
mode supports the communication between a dual-stack host in an IPv4
network and a non-IVI IPv6 server.

2.5. The Communication Process

Giving a communication between an IPv6 host and an IPv4-only host, if
the IPv6 host is an IVI IPv6 host, we take the IVI mechanism to
realize the communication. However, if the IPv6 host is a non-IVI
IPv6 host, we adopt the IVIT mechanism instead. That is to say, the
IVI and IVIT's integration may solve the communication problem
between an IPv4 network and an IPv6 network and ensure statelessness
at the core without DNS-ALG. In this section, we mainly give a
detailed description about the communication between a non-IVI Ipv6
host and a dual-stack host in an IPv4 network.

First of all, we describe the communication between a dual-stack host
in an IPv4 network and a non-IVI IPv6 host. If a non-IVI IPv6 host H
accesses a dual-stack server S in an IPv4 network, which is a main
application scenario of dual-stack host mode, S's IPv6 address is
according to 2.2 format. Meanwhile, S and the IVI gateway support
encapsulation/decapsulation.

The communication from H to S is as follows. H queries DNS server
for S address and DNS server returns the S's IPv6 address. Then, H
sends the IPv6 packets where Src IPv6 address is H's address and Dst
IPv6 address is S's IPv6 address of the dual-stack server to the IVI
gateway. The IVI gateway extracts the destination's IPv4 address
from the Dst IPv6 address and encapsulates the IPv6 packets into IPv4
packets since the eight bits from 32 to 39 are all zeros (IVIT ID),
where Src IPv4 address is IVI gateway's IPv4 address and Dst IPv4
address is S's IPv4 address obtained from the Dst IPv6 address, and
then forwards the IPv4 packets to S. S decapsulates the IPv4 packets
and hands the IPv6 packets to the upper layer.

The response is as follows. S constructs the IPv6 packets where Src
IPv6 address is local IPv6 address and Dst IPv6 address is H's
address. Then S encapsulates IPv6 packets into IPv4 packets where
Src IPv4 address is S's IPv4 address and Dst IPv4 address is IVI
gateway's IPv4 address, and then sends the IPv4 packets to IVI
gateway. IVI gateway decapsulates IPv4 packets and forwards the IPv6
packets to H.

If a dual-stack host H in an IPv4 network communicates with a non-IVI
IPv6 server S, H's IPv6 addresses are 2.2 format. H and IVI gateway
support encapsulation/decapsulation. The communication is as
follows. H queries DNS server for S address and DNS server returns
S's address. H constructs the IPv6 packets where Src IPv6 address is
local IPv6 address and Dst IPv6 address is S's address. Then H
encapsulates IPv6 packets into IPv4 packets where Src IPv4 address is
H's IPv4 address and Dst IPv4 address is IVI gateway's IPv4 address,
and sends the IPv4 packets to IVI gateway. IVI gateway decapsulates
the IPv4 packets and forwards the IPv6 packets to S.

The response is as follows. S sends the IPv6 packets where Src IPv6
address is S's address and Dst IPv6 address is H's IPv6 address. IVI
gateway encapsulates the IPv6 packets into IPv4 packets where Src
IPv4 address is IVI gateway's IPv4 address and Dst IPv4 address is
H's IPv4 address obtained from the Dst IPv6 address, and forwards the
IPv4 packets to H. H decapsulates the IPv4 packets and hands the IPv6
packets to the upper layer.

2.6. An Example

Suppose a non-IVI IPv6 host with the address 3FFE:3600:8::1 access a
dual-stack server in an IPv4 network whose IPv4 and IPv6 addresses
are 163.162.1.1 and 2001:da8:00a3:a201:0100::0/72, where 2001:da8 is
the ISP's IVI IPv6 prefix. The IVI gateway has the IPv4 address
140.125.1.3 and the IPv6 address 2001:da8:ff8c:7d01:0300::0/72(the
IVI address). The non-IVI IPv6 host sends the IPv6 packets where the
Src address is 3FFE:3600:8::1 and the Dst address is 2001:da8:00a3:

a201:0100::0/72. When the IPv6 packets arrive at the IVI gateway,
the IVI gateway encapsulates the IPv6 packets into the IPv4 packets
where the Src address is 140.125.1.1 and the Dst address is
163.162.1.1 obtained from the Dst IPv6 address. Then, forward the
IPv4 packets to the dual-stack server. The dual-stack server
receives these packets and decapsulates the IPv4 packets into the
IPv6 packets, then sends to the upper layer.

The response process is as follows. The dual-stack server sends the
IPv6 packets where Src address is 2001:da8:00a3:a201:0100::0/72 and
Dst address is 3FFE:3600:8::1. For transmitting the IPv6 packets in
the IPv4 network, the dual-stack server then encapsulates the IPv6
packets into the IPv4 packets where the Src address is 163.162.1.1
and the Dst address is 140.125.1.3. When the encapsulation packets
arrive at the IVI gateway, the IVI gateway decapsulates the packets
and gets the IPv6 packets. Then, the IVI gateway forwards the IPv6
packets to the destination 3FFE:3600:8::1.

3. CPE Mode

3.1. Basic Idea of the CPE Mode

The basic idea of the CPE Mode is similar to that of the dual-stack
host mode. But, in this mode, the IPv4-only host needs no change and
the CPE is modified into dual-stack and becomes the endpoint of the
tunnel.

3.2. CPE Modified Operation

In the CPE mode, the IPv4-only host has no change and the CPE is
upgraded to dual-stack. The modified CPE supports encapsulation/
decapsulation and mapping. For mapping, the CPE has an IPv4 address
pool. The CPE maintains the mapping between the IPv6 host's IPv6
address and an IPv4 address in the IPv4 address pool. Since the IPv4
addresses mapped from the IPv6 host's IPv6 address are used locally,
private IPv4 addresses can be used to in the IPv4 address pool. The
IPv4 hosts' IPv4 addresses can also be private addresses. The IVI
extended IPv6 address of the dual-stack CPE is according to section
3.2. Constructing the IPv6 packets and establishing the tunnel on
the CPE resemble the dual-stack host mode. But there are some
differences as follows.

1) When an IPv4-only host wants to access an IPv6 host, the IPv4-only
host does DNS query and the DNS server returns the IPv6 address of
the IPv6 host. The CPE can capture the DNS response, and map the
IPv6 host's IPv6 address into one IPv4 address from the IPv4 address
pool, then send the IPv4 address to the IPv4-only host. The IPv4-
only host uses the IPv4 address as the Dst IPv4 address to construct
IPv4 packets.

2) When constructing the IPv6 packets, CPE uses the IVI extended IPv6
address as Src address, and uses the IPv6 address mapped from Dst
IPv4 address in IPv4 packets as Dst address.

3.3. The Mapping Rule between the CPE IPv6 address and the IPv4 only
         address

We need a mapping rule between the CPE's IPv6 address and the IPv4-
only address in two cases. One is that the CPE translates the IPv4
packets into the IPv6 packets where the Src IPv6 address is created
by the mapping rule. The other is that an IPv6 address accesses a
private IPv4 address where the mapping rule is adopted to
differentiate the private IPv4 address from the Dst CPE IPv6 address.
The mapping rule is shown in Figure 4.

```
| 0                |32 |40                |72                |104     127|
   -----------------------------------------------------------------
|                   |00 |                   |                 |          |
   -----------------------------------------------------------------
|<-IPv6 prefix->|    |<-IPv4 address->|<-IPv4 address->|<-  zero ->|
                              of CPE        of the IPv4 host    padding
```
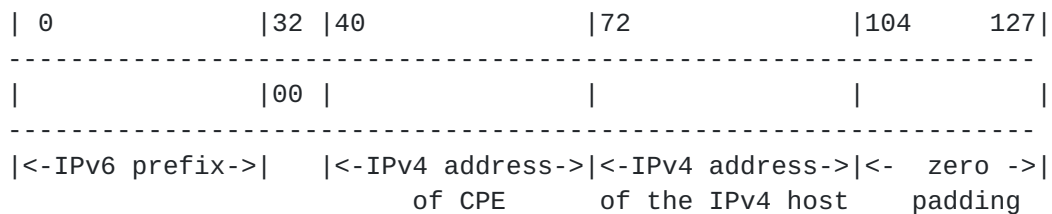
Figure 4: The mapping rule between the IPv4 address and the CPE's
IPv6 address

In this 1-to-1 mapping, the bits from 72 to 103 are IPv4 address of
the IPv4-only host. Accordingly, we can identify the address of the
IPv4-only host from the CPE's IPv6 address. Meanwhile, the DNS
server creates a mapping in the DNS. For example, if the IPv4
address of an IPv4-only host is 10.10.20.1 and the CPE's IPv6 address
is 2001:da8:000A:0A0A:0100::0/72, the mapped IPv6 address is 2001:
da8:000A:0A0A:010A:0A14:0100::0/104. If another IPv4 address is
10.10.30.1, the mapped IPv6 address is 2001:da8:000A:0A0A:010A:0A1E:
0100::0/104. When the IPv6 address 2001:da8:000A:0A0A:010A:0A14:
0100::0/104 is received, we can map into the 10.10.20.1 IPv4 address.
And if the address 2001:da8:000A:0A0A:010A:0A1E:0100::0/104 is
received, we can map into the 10.10.30.1 IPv4 address. Contrarily,
if the address 10.10.30.1 is received, the CPE translates the IPv4
address into 2001:da8:000A:0A0A:010A:0A1E:0100::0/104.

3.4. Application Scenarios

The CPE mode supports the communication between an IPv4 network and
an IPv6 network, especially the bidirectional communications between
a private IPv4 host and a non-IVI IPv6 host.

3.5. The Communication Process

Giving a communication between an IPv6 host and an IPv4-only host, if
the IPv6 host is an IVI IPv6 host, we take the IVI mechanism to
realize the communication. However, if the IPv6 host is a non-IVI
IPv6 host, we adopt the IVIT mechanism instead. That is to say, the
IVI and IVIT's integration may solve the communication problem
between an IPv4 network and an IPv6 network, and ensure statelessness
at the core without DNS-ALG. In this section, we mainly give a
detailed description about the communication between a non-IVI Ipv6
host and a private IPv4 host in an IPv4 network.

If a private IPv4 host H accesses a non-IVI IPv6 server S, the
communication process is as follows. H queries the Dst address from
DNS server. At first, H sends the query packets, and DNS server
returns the S's address to CPE. CPE then receives the returned

packets and identifies that the address is an IPv6 address and
extracts an IPv4 address from the address pool to map the IPv6
address, and then returns the selected IPv4 address to H. H sends the
IPv4 packets where the src address is local address and the Dst
address is the mapped IPv4 address from the CPE. The CPE receives
the IPv4 packets, constructs the IPv6 packets where Src IPv6 address
is obtained from the mapping rule described in Section 3.3 and the
Dst IPv6 address is S's address (query the mapping list, get the
corresponding IPv6 address from the Dst IPv4 address in the IPv4
packets). CPE encapsulates IPv6 packets into IPv4 packets where Src
IPv4 address is CPE's IPv4 address and Dst IPv4 address is IVI
gateway's IPv4 address and sends the IPv4 packets to IVI gateway.
IVI gateway decapsulates IPv4 packets and forwards the IPv6 packets
to S.

The responding packets are as follows. S sends the IPv6 packets
where Src IPv6 address is S's address and Dst IPv6 address is the
received IPv6 address to IVI gateway. IVI gateway encapsulates the
IPv6 packets into IPv4 packets where Src IPv4 address is IVI
gateway's IPv4 address and Dst IPv4 address is CPE's IPv4 address
obtained from the Dst Ipv6 address, and forwards the IPv4 packets to
CPE. CPE decapsulates the IPv4 packets, translates the IPv6 packets
into the IPv4 packets(query the mapping table, use the mapping rule
described in Section 3.3 and get the corresponding address
information) and sends the IPv4 packets to H.

If a non-IVI IPv6 host H communicates with a private IPv4 server S in
an IPv4 network. The communication is as follows. At first, H
queries the address information of S. DNS server returns the IPv6
address according to the mapping rule described in Section 3.3. H
receives the response and sends the IPv6 packets where Src IPv6
address is H's address and Dst IPv6 address is the returned IPv6
address to IVI gateway. IVI gateway encapsulates the IPv6 packets
into IPv4 packets where Src IPv4 address is IVI gateway's IPv4
address and Dst IPv4 address is CPE's IPv4 address, and forwards the
IPv4 packets to CPE. CPE decapsulates the IPv4 packets, translates
the IPv6 packets into the IPv4 packets and sends the IPv4 packets to
S.

The responding packets are as follows. S sends the IPv4 packets
according to the sent address information. CPE constructs the IPv6
packets according to the address mapping table. Then CPE
encapsulates IPv6 packets into IPv4 packets where Src IPv4 address is
CPE's IPv4 address and Dst IPv4 address is IVI gsteway's IPv4
address, and sends the IPv4 packets to IVI gateway. IVI gateway
decapsulates IPv4 packets and forwards the IPv6 packets to H.

3.6. An Example

   Suppose a non-IVI IPv6 host with the address 3FFE:3600:8::1
   communicates with a private IPv4-only host whose IP address is
   10.10.20.3. In this communication, the IP addresses of the
   corresponding CPE are 163.162.1.1 and 2001:da8:00a3:a201:0100::0/72.
   The CPE establishes the mapping 192.168.5.12<->3FFE:3600:8::1. The
   IVI gateway has the IPv4 address 140.125.1.3 and the IPv6 address
   2001:da8:ff8c:7d01:0300::0/72(the IVI address).

   Firstly, the non-IVI IPv6 host queries the Dst IP address, and DNS
   server returns the IPv6 address 2001:da8:00a3:a201:010A:0A14:0300::0/
   104. The IPv6 host sends the IPv6 packets where the Src address is
   3FFE:3600:8::1 and the Dst address is 2001:da8:00a3:a201:010A:0A14:
   0300::0/104. When the IPv6 packets arrive at the IVI gateway, it
   encapsulates the IPv6 packets into the IPv4 packets where the Src
   address is 140.125.1.1 and the Dst address is 163.162.1.1 obtained
   from the Dst IPv6 address, and forwards the IPv4 Packets to the dual-
   stack CPE. The dual-stack CPE receives these packets and
   decapsulates the IPv4 packets into the IPv6 packets where the Src
   address is 3FFE:3600:8::1 and the Dst address is 2001:da8:00a3:a201:
   010A:0A14:0300::0/104. Then the CPE queries the mapping table bases
   on the mapping rule described in Section 4.2, and obtains the
   corresponding mapping. At last, it sends the IPv4 packets where the
   src address is 192.168.5.12 and the dst address is 10.10.20.3 to the
   private IPv4 server.

   The response process is as follows. The private IPv4 server sends
   the IPv4 packets where the Src address is 10.10.20.1 and the Dst
   address is 192.168.5.12. The dual-stack CPE receives the IPv4
   packets and constructs the IPv6 packets where the Src address is
   2001:da8:00a3:a201:010A:0A14:0300::0/104, and the Dst address is
   3FFE:3600:8::1. For transmitting the IPv6 packets in the IPv4
   network, the dual-stack CPE then encapsulates the IPv6 packets into
   the IPv4 packets where the Src address is 163.162.1.1 and the Dst
   address is 140.125.1.3. When the encapsulation packets arrive at the
   IVI gateway, it decapsulates the packets and gets the IPv6 packets.
   Then, the IVI gateway forwards the translated IPv6 packets to the Dst
   address 3FFE:3600:8::1.

4. **Integrated with IVI**

   Owing to IVIT, the IVI gateway must identify IVIT from IVI. The
   identification mechanism should be adopted in The IVI gateway. In
   the identification mechanism, the operation of the IVI gateway should
   be classified into the following two cases.

   1) When the IVI gateway receives the IPv6 packets, if the dst address
   in the IPv6 packets is an IVI IPv6 address, the IVI gateway
   implements the IVI function, if the dst address isn't an IVI IPv6
   address, the IVI gateway implements the IVIT function.

   2) When the IVI gateway receives the IPv4 packets, if the dst address
   in the IPv4 packets isn't the IVI gateway's address, the IVI gateway
   implements the IVI function, if the dst address is the IVI gateway's
   address, the IVI gateway implements the IVIT function.

[5](#). **Conclusion**

   In this draft, we proposed an IVI+Tunnel mechanism to solve the
   communication problem between a non-IVI IPv6 network and an IPv4
   network. IVIT has evident advantages in the following three aspects.

   1) In the dual-stack host mode, all IPv6 hosts may access the dual-
   stack servers in an IPv4 network.

   2) In the CPE mode, the address pool of a CPE may use the private
   addresses, which saves more global IPv4 addresses.

   3) In the CPE mode, IVIT may support the bidirectional communication
   between a private IPv4 network and an IPv6 network.

   Integrating IVI and IVIT may resolve the communication problem
   between an IPv4 network and an IPv6 network. IVI and IVIT union is
   stateless at the core and without DNS-ALG related issues. So IVIT
   has high scalability and effectiveness.

6. **Security Considerations**

   This document presents IVIT (IVI+Tunnel) for the communication
   between an IPv4 network and a non-IVI IPv6 network. The IPv4
   security and IPv6 security issues should be addressed using related
   documents of each address family and are not included in this
   document.

7. IANA Considerations

8. References

8.1. Normative References

[RFC2119]   Bradner, S., "Key words for use in RFCs to Indicate
            Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC2765]   Nordmark, E., "Stateless IP/ICMP Translation Algorithm
            (SIIT)", RFC 2765, February 2000.

[RFC2766]   Tsirtsis, G. and P. Srisuresh, "Network Address
            Translation - Protocol Translation (NAT-PT)", RFC 2766,
            February 2000.

[RFC5214]   Templin, F., Gleeson, T., and D. Thaler, "Intra-Site
            Automatic Tunnel Addressing Protocol (ISATAP)", RFC 5214,
            March 2008.

[RFC3056]   Carpenter, B. and K. Moore, "Connection of IPv6 Domains
            via IPv4 Clouds", RFC 3056, February 2001.

[RFC3068]   Huitema, C., "An Anycast Prefix for 6to4 Relay Routers",
            RFC 3068, June 2001.

[RFC4966]   Aoun, C. and E. Davies, "Reasons to Move the Network
            Address Translator - Protocol Translator (NAT-PT) to
            Historic Status", RFC 4966, July 2007.

8.2. Informative References

[I-D.xli-behave-ivi]
            Li, X., Bao, C., Chen, M., Zhang, H., and J. Wu, "The
            CERNET IVI Translation Design and Deployment for the IPv4/
            IPv6 Coexistence and Transition", draft-xli-behave-ivi-02
            (work in progress), June 2009.

Authors' Addresses

   Mingwei Xu
   Tsinghua University
   Department of Computer Science, Tsinghua University
   Beijing 100084
   P.R.China

   Phone: +86-10-6278-5822
   Email: xmw@csnet1.cs.tsinghua.edu.cn

   Chunmei Xia
   Tsinghua University
   Department of Computer Science, Tsinghua University
   Beijing 100084
   P.R.China

   Phone: +86-10-6278-5822
   Email: xcm1977@sina.com

   Xing Li
   Tsinghua University
   Department of Electronic Engineering, Tsinghua University
   Beijing 100084
   P.R.China

   Phone: +86-10-6278-5983
   Email: xing@cernet.edu.cn

   Yong Cui
   Tsinghua University
   Department of Computer Science, Tsinghua University
   Beijing 100084
   P.R.China

   Phone: +86-10-6278-5822
   Email: cuiyong@tsinghua.edu.cn

   Jianping Wu
   Tsinghua University
   Department of Computer Science, Tsinghua University
   Beijing 100084
   P.R.China

   Phone: +86-10-6278-5983
   Email: jianping@cernet.edu.cn