IPng Working Group
INTERNET-DRAFT

A. Conta (Lucent)

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Transmission of IPv6 Packets over IPv6 and IPv4 Tunnels.

Specification

draft-conta-ipv6-trans-tunnel-00.txt

Status of this Memo

Abstract

This memo describes the transmission of IPv6 packets over IPv6 and IPv4 tunnels, and the IPv6 tunnel link local addresses.

1. Introduction

This document specifies the frame format for transmission of IPv6 packets and the method of forming IPv6 link-local addresses on IPv6 tunnels. It also specifies the content of the Source/Target Link-layer Address option used in Inverse Neighbor Solicitation, and Neighbor Advertisement messages when those messages are transmitted over an IPv6 tunnel [IND_TUN].

The keywords MUST, MUST NOT, MAY, OPTIONAL, REQUIRED, RECOMMENDED, SHALL, SHALL NOT, SHOULD, SHOULD NOT are to be interpreted as defined in RFC 2119.

2. Maximum Transmission Unit

The default MTU size for IPv6 or IPv4 tunnels is the MTU of the underlying physical interface less the size of the tunnel headers [TUNNEL].

The MTU can be reduced by manual configuration. An IPv6 or IPv4 tunnel MTU cannot be larger than its default size.

3. Frame format

IPv6 packets are transmitted in standard IPv6 packet format - IPv6 packets are payloads of IPv6 Tunnel packets.

The IPv6 tunnel header contains as Source and Destination the tunnel entry-point and exit-point node addresses. The tunnel IPv6 header is filled in conforming to [TUNNEL].

4. Stateless Autoconfiguration

This applies only for IPv6 tunnels.

The interface token [CONF] for an IPv6 tunnel pseudo-interface must be unique on the virtual link represented by the tunnel, i.e., the tunnel's end-point nodes must have distinct pseudo-interface tokens. The default IPv6 tunnel pseudo-interface token is based on the underlying physical interface EUI-64 identifier [ETHER]. It is the result of masking the forth and fifth octets of the EUI-64 identifier with the fixed FFFC hexadecimal value.

For instance for an underlying physical interface EUI-64 identifier

36-56-78-FF-FE-9A-BC-DE.

the IPv6 tunnel pseudo-interface token is:

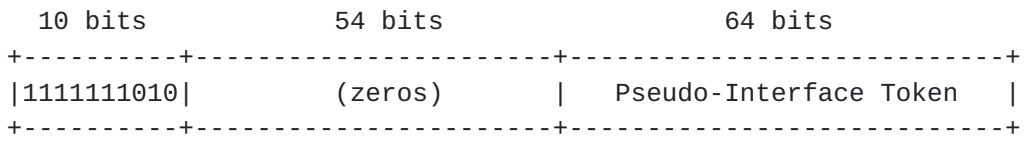
36-56-78-FF-FC-9A-BC-DE.

An IPv6 address prefix used for stateless autoconfiguration of an IPv6 tunnel interface must have a length of 64 bits.

5. Link-Local Addresses

This applies only to IPv6.

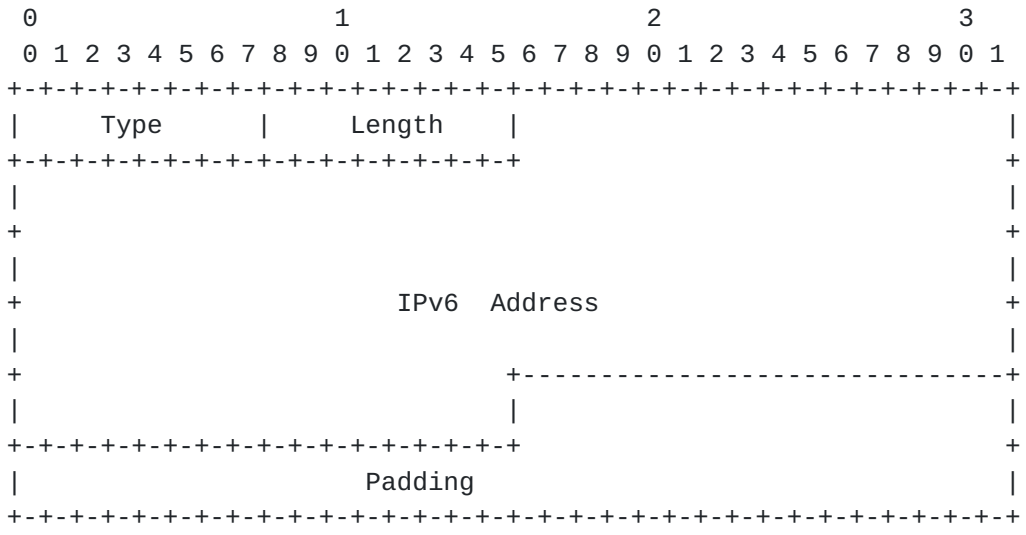
The IPv6 link-local address [AARCH] for an IPv6 tunnel pseudo-interface is formed by appending the pseudo-interface token, as defined above, to the prefix FE80::/64.



6. Address Mapping - Unicast

The procedure for mapping IPv6 addresses to tunnel IPv6 or IPv4 addresses is described in [IND_TUN].

The Source/Target Virtual Link-layer Address option has the following form when the (virtual) link layer is an IPv6 or IPv4 tunnel.



or

Option fields:

Type 1 for Source Link-layer address.
2 for Target Link-layer address.

Length 3 (in units of 8 octets) for IPv6 addresses
1 (in units of 8 octets) for IPv4 addresses

IPv6 Address
The 128 bit IPv6 address of the IPv6 tunnel pseudo-interface.

or

IPv4 Address
The 32 bit IPv4 address of the IPv4 tunnel pseudo-interface.

7. Security Considerations

The mechanisms defined in this document for generating IPv6 tunnel address tokens are intended to provide virtual link uniqueness. There is no security protection from duplication through forgery or accident.

8. Acknowledgments

This draft is a result of a discussion with Steve Deering about the applicability and benefits of Neighbor Discovery for IPv6 tunnels. After more thinking and in combination with IPv6 Inverse Neighbor Discovery things seemed to fall into place.

The IPv4 part is an idea that Dan Harrington suggested, and it was very easy to add.

9. References

[RFC-1883] S. Deering, R. Hinden, "Internet Protocol Version 6 Specification"

[RFC-1885] A. Conta, and S. Deering "Internet Control Message Protocol for the Internet Protocol Version 6 (IPv6)"

[RFC-1970] T. Narten, E. Nordmark, W.Simpson "Neighbor Discovery for IP Version 6 (IPv6)"

[IND_TUN] A. Conta "IPv6 ND Extensions for Inverse Neighbor Discovery.

[TUNNEL] A. Conta, S. Deering "Generic IPv6 Encapsulation".

[ETHER] M. Crawford "Transmission of IPv6 packets over Ethernet"

Authors' Addresses

Alex Conta
Lucent Technologies Inc.
300 Baker Ave, Suite 100
Concord, MA 01742
+1-508-287-2842

email: aconta@lucent.com