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Category: Standards Track

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A Method for the Transmission of IPv6 Packets over Ethernet Networks

Status of this Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

Introduction

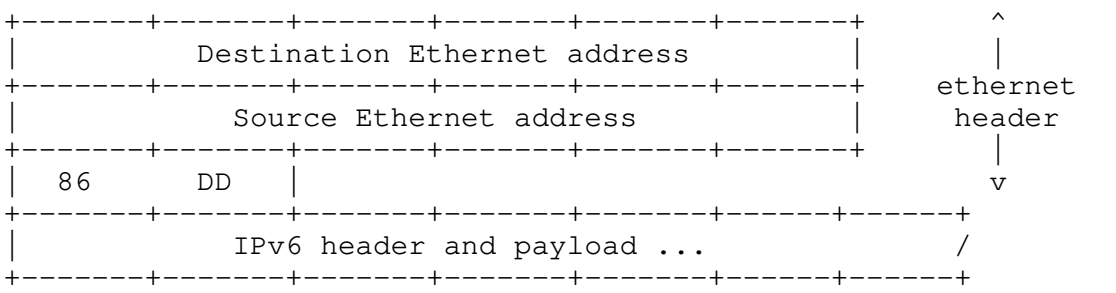
This memo specifies the frame format for transmission of IPv6 [IPV6] packets and the method of forming IPv6 link-local addresses on Ethernet networks. It also specifies the content of the Source/Target Link-layer Address option used the the Router Solicitation, Router Advertisement, Neighbor Solicitation, and Neighbor Advertisement messages described in [DISC], when those messages are transmitted on an Ethernet.

Maximum Transmission Unit

The default MTU size for IPv6 packets on an Ethernet is 1500 octets. This size may be reduced by a Router Advertisement [DISC] containing an MTU option which specifies a smaller MTU, or by manual configuration of each node. If a Router Advertisement is received with an MTU option specifying an MTU larger than 1500, or larger than a manually configured value less than 1500, that MTU option must be ignored.

Frame Format

IPv6 packets are transmitted in standard Ethernet frames. The ethernet header contains the Destination and Source ethernet addresses and the ethernet type code, which must contain the value 86DD hexadecimal. The data field contains the IPv6 header followed immediately by the payload, and possibly padding octets to meet the minimum frame size for Ethernet.

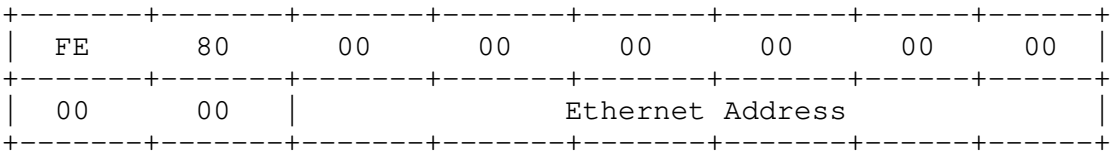


Stateless Autoconfiguration and Link-Local Addresses

The address token [CONF] for an Ethernet interface is the interface's built-in 48-bit IEEE 802 address, in canonical bit order and with the octets in the same order in which they would appear in the header of an ethernet frame. (The individual/group bit is in the first octet and the OUI is in the first three octets.) A different MAC address set manually or by software should not be used as the address token.

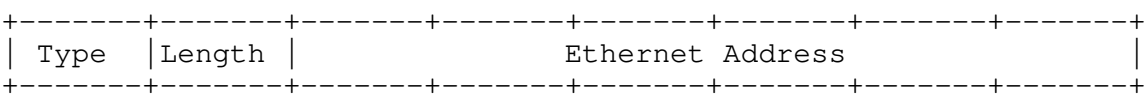
An IPv6 address prefix used for stateless autoconfiguration of an ethernet interface must be 80 bits in length.

The IPv6 Link-local address [AARCH] for an Ethernet interface is formed by appending the interface's IEEE 802 address to the 80-bit prefix FE80::.



Address Mapping -- Unicast

The procedure for mapping IPv6 addresses into Ethernet link-layer addresses is described in [DISC]. The Source/Target Link-layer Address option has the following form when the link layer is Ethernet.



Option fields:

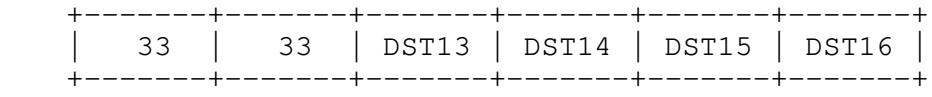
Type 1 for Source Link-layer address.
2 for Target Link-layer address.

Length 1 (in units of 8 octets).

Ethernet Address
The 48 bit Ethernet IEEE 802 address, in canonical bit order. This is the address the interface currently responds to, and may be different from the built-in address used as the address token.

Address Mapping -- Multicast

An IPv6 packet with a multicast destination address DST is transmitted to the Ethernet multicast address whose first two octets are the value 3333 hexadecimal and whose last four octets are the last four octets of DST, ordered from more to least significant.



Security Considerations

Security issues are not discussed in this memo.

References

[AARCH] Hinden, R., and S. Deering, "IP Version 6 Addressing Architecture", RFC 1884, December 1995.

[CONF] Thomson, S., and T. Narten, "IPv6 Stateless Address Autoconfiguration", RFC 1971, August 1996.

[DISC] Narten, T., Nordmark, E., and W. Simpson, "Neighbor Discovery for IP Version 6 (IPv6)", RFC 1970, August 1996.

[IPV6] Deering, S., and R. Hinden, "Internet Protocol, Version 6 (IPv6) Specification", RFC 1883, December 1995.

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