Network Working Group
Request for Comments: 2497
See Also: 1201
Category: Standards Track

I. Souvatzis
The NetBSD Project

January 1999

# Transmission of IPv6 Packets over ARCnet Networks

## Status of this Memo



## Copyright Notice



## 1. Introduction

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

> 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 [KWORD].

## 2. Frame Format

IPv6 packets are link layer fragmented and reassembled according to [PHDS]. A brief but sufficient discussion of this fragmentation method can be found in [ARCIPV4].

The protocol ID (System Code in ARCnet terminology) assigned to IPv6 is C4 hexadecimal.

## 3. Maximum Transmission Unit

The maximum IPv6 packet length possible using this encapsulation method is 60480 octets. Since this length is impractical because of its worst case transmission time of several seconds, all ARCnet implementations on a given ARCnet network should agree on a smaller value.

The default MTU for IPv6 [IPV6] packets on an ARCnet is 9072 octets.

In the presence of a router, this size MAY be changed by a Router Advertisement [DISC] containing an MTU option. If a Router Advertisement is received with an MTU option specifying an MTU larger than 60480, or larger than a manually configured value less than 60480, that MTU option may be logged to system management but MUST be otherwise ignored.

If no router is available, the local MTU MUST be left at 9072 or MUST be manually configured to the same different value on all connected stations.

Implementations MAY accept arriving IPv6 datagrams which are larger than their configured maximum transmission unit. They are not required to discard such datagrams. If they can not handle larger datagrams, they MAY log the event to the system administration, but MUST otherwise silently discard them.

## 4. Stateless Auto-configuration

If a node has an EUI-64 which is not used to form the Interface Identifier for any other interface, it SHOULD use that EUI-64 to form the Interface Identifier for its ARCnet interface. If that EUI-64 is in use for another interface attached to a different link, it MAY be used for the ARCnet interface as well.

The Interface Identifier is then formed from the EUI-64 by complementing the "Universal/Local" (U/L) bit, which is the next-to-lowest order bit of the first octet of the EUI-64.

When a node has no EUI-64 available for forming its ARCnet Interface Identifer, it MUST form that identifier as specified in [AARCH], Appendix A, section "Links with Non-Global Identifier". That is, the 8 bit manually configured ARCnet address is appended to the 56 zero bits.

For example, for an ARCnet interface with the configured address of 49 hexadecimal this results in the following identifier:

```
|0               1|1               3|3               4|4               6|
|0               5|6               1|2               7|8               3|
+-----------------+-----------------+-----------------+-----------------+
|0000000000000000|0000000000000000|0000000000000000|0000000001001001|
+-----------------+-----------------+-----------------+-----------------+
```

Note that this results in the universal/local bit set to "0" to indicate local scope.

An IPv6 address prefix used for stateless auto-configuration [ACONF] of an ARCnet interface MUST have a length of 64 bits.

## 5. Link-Local Addresses

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

```
 10 bits            54 bits                  64 bits
+----------+-----------------------+-----------------------------+
|1111111010|         (zeros)       |    Interface Identifier     |
+----------+-----------------------+-----------------------------+
```

## 6. Address Mapping -- Unicast

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

```
 0                   1
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     Type      |    Length     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|ARCnet address |               |
+---------------+              -+
|                               |
+-    5 octets of padding      -+
|                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Option fields:

Type 1 for Source Link-layer address.
2 for Target Link-layer address.
Length 1 (in units of 8 octets).

ARCnet address The 8 bit ARCnet address, in canonical bit order.

## 7. Address Mapping -- Multicast

As ARCnet only provides 1 multicast address (00 hexadecimal), all IPv6 multicast addresses MUST be mapped to this address.

## 8. Security Considerations

The method of derivation of Interface Identifiers from ARCnet addresses is intended to preserve local uniqueness when possible. However, there is no protection from duplication through accident or forgery.

## 9. Acknowledgements

Big parts of the new version of this memo are either based on [ETHIPV6] or on Matt Crawford's review of an earlier version.

## 10. References

[AARCH] Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture", RFC 2373, July 1998.

[ACONF] Thomson, S. and T. Narten, "IPv6 Stateless Address Autoconfiguration", RFC 2462, December 1998.

[ARCIPV4] Provan, D., "Transmitting IP Traffic over ARCNET Networks", RFC1201, Novell, Inc., February 1991.

[DISC] Narten, T., Nordmark, E. and W. Simpson, "Neighbor Discovery for IP Version 6 (IPv6)", RFC 2461, December 1998.

[ETHIPV6] Crawford, M., "Transmission of IPv6 Packets over Ethernet Networks", RFC 2464, December 1998.

[EUI64] "64-Bit Global Identifier Format Tutorial", http://standards.ieee.org/db/oui/tutorials/EUI64.html.

[IPV6] Deering, S. and R. Hinden, "Internet Protocol, Version 6 (IPv6) Specification", RFC 2460, December 1998.

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

[PHDS] Novell, Inc., "ARCNET Packet Header Definition Standard", Novell Part Number 100-00721-001, November 1989.

## 11. Author's Address

Ignatios Souvatzis
The NetBSD Project
Stationenweg 29
D-53332 Bornheim
Germany

Phone (work): +49 (228) 734316
EMail: is@netbsd.org

## 12. Full Copyright Statement