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IANA Allocation Guidelines for the Address Resolution Protocol (ARP)

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.

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Abstract

This document specifies the IANA guidelines for allocating new values in the Address Resolution Protocol (ARP). This document also reserves some numbers for experimentation purposes. The changes also affect other protocols that employ values from the ARP name spaces.

1. Introduction

This document specifies the IANA guidelines [RFC5226] for allocating new values for various fields in the Address Resolution Protocol (ARP) [RFC0826]. The change is also applicable to extensions of ARP that use the same message format, such as [RFC0903], [RFC1931], and [RFC2390].

The change also affects other protocols that employ values from the ARP name spaces. For instance, the ARP hardware address type (ar$hrd) number space is also used in the "htype" (hardware address type) fields in the Bootstrap Protocol (BOOTP) [RFC0951] and Dynamic Host Configuration Protocol (DHCP) [RFC2131], as well as in the "hardware type" field in the DHCP Unique Identifiers in DHCPv6 [RFC3315]. These protocols are therefore affected by the update in the IANA rules. Other affected specifications include the specialized address resolution mechanisms in:

- HYPERchannel [RFC1044]
- DHCP options [RFC2132] [RFC4361]
- ATM (Asynchronous Transfer Mode) ARP [RFC2225]
- HARP (High-Performance Parallel Interface ARP) [RFC2834] [RFC2835]
- Dual MAC (Media Access Control) FDDI (Fiber Distributed Data Interface) ARP [RFC1329]
- MAPOS (Multiple Access Protocol over Synchronous Optical Network/ Synchronous Digital Hierarchy) ARP [RFC2176]
- FC (Fibre Channel) ARP [RFC4338]
- DNS DHCID Resource Record [RFC4701]

The IANA guidelines are given in Section 2. Previously, no IANA guidance existed for such allocations. The purpose of this document is to allow IANA to manage number assignments based on these guidelines in a consistent manner.

This document also reserves some numbers for experimentation purposes. These numbers are given in Section 3.

2. IANA Considerations

The following rules apply to the fields of ARP:

ar$hrd (16 bits) Hardware address space

Requests for ar$hrd values below 256 or for a batch of more than one new value are made through Expert Review [RFC5226].

Note that certain protocols, such as BOOTP and DHCPv4, employ these values within an 8-bit field. The expert should determine that a need to allocate the new values exists and that the existing values are insufficient to represent the new hardware address types. The expert should also determine the applicability of the request and assign values higher than 255 for requests that do not apply to BOOTP/DHCPv4. Similarly, the expert should assign 1-octet values for requests that apply to BOOTP/DHCPv4, as for example the "IPsec tunnel" with value 31 [RFC3456]. Conversely, ARP-only uses, without a foreseeable reason to use the same value in BOOTP/DHCPv4, should favor 2-octet values.

Requests for individual new ar$hrd values that do not specify a value, or where the requested value is greater than 255, are made through First Come First Served [RFC5226]. The assignment will always result in a 2-octet value.

ar$pro (16 bits) Protocol address space

These numbers share the Ethertype space. The Ethertype space is administered as described in [RFC5342].

ar$op (16 bits) Opcode

Requests for new ar$op values are made through IETF Review or IESG Approval [RFC5226].

3. Allocations Defined in This Document

When testing new protocol extension ideas, it is often necessary to use an actual constant in order to use the new function, even when testing in a closed environment. This document reserves the following numbers for experimentation purposes in ARP:

- Two new ar$hrd values are allocated for experimental purposes: HW_EXP1 (36) and HW_EXP2 (256). Note that these two new values were purposely chosen so that one would be below 256 and the other would be above 255, and so that there would be different values in the least and most significant octets.

- Two new values for the ar$op are allocated for experimental purposes: OP_EXP1 (24) and OP_EXP2 (25).

Note that Appendix B.2 of [RFC5342] lists two Ethertypes that can be used for experimental purposes.

In addition, for both ar$hrd and ar$op, the values 0 and 65535 are marked as reserved. This means that they are not available for allocation.

4. Security Considerations

This specification does not change the security properties of the affected protocols.

However, a few words are necessary about the use of the experimental code points defined in Section 3. Potentially harmful side effects from the use of the experimental values need to be carefully evaluated before deploying any experiment across networks that the owner of the experiment does not entirely control. Guidance given in [RFC3692] about the use of experimental values needs to be followed.

5. Acknowledgments

The lack of any current rules has come up as new values were requested from IANA, who contacted the IESG for advice. The author would like to thank Michelle Cotton in particular for bringing up this issue. The author would also like to thank Brian Carpenter, Thomas Narten, Scott Bradner, Donald Eastlake, Andrew G. Malis, Brian Haberman, Robert Sparks, Larry Zhu, and Dave Thaler for feedback.

6. References

6.1. Normative References

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6.2. Informative References

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Appendix A. Changes from the Original RFCs

This document specifies only the IANA rules associated with various fields in ARP. The specification of these rules also affects the allocation of corresponding fields in protocols listed in Section 1 that share the registry. This document does not make any changes in the operation of these protocols themselves.

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