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IANA Considerations for Network Layer Protocol Identifiers

Abstract

Some protocols being developed or extended by the IETF make use of the ISO/IEC (International Organization for Standardization / International Electrotechnical Commission) Network Layer Protocol Identifier (NLPID). This document provides NLPID IANA considerations.

Status of This Memo

This memo documents an Internet Best Current Practice.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on BCPs is available in Section 2 of RFC 5741.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at http://www.rfc-editor.org/info/rfc6328.

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1. Introduction

Some protocols being developed or extended by the IETF make use of the ISO/IEC (International Organization for Standardization / International Electrotechnical Commission) Network Layer Protocol Identifier (NLPID).

The term "NLPID" is not actually used in [ISO9577], which refers to one-octet IPIs (Initial Protocol Identifiers) and SPIs (Subsequent Protocol Identifiers). While these are two logically separate kinds of one-octet identifiers, most values are usable as both an IPI and an SPI. In the remainder of this document, the term NLPID is used for such values.

The registry of NLPID values is maintained by ISO/IEC by updating [ISO9577]. The procedure specified by ISO/IEC in that document is that an NLPID code point can be allocated without approval by ISO/IEC, as long as the code point is not in a range of values categorized for an organization other than the organization allocating the code point and as long as ISO/IEC JTC1 SC6 is informed.

This document provides NLPID IANA considerations. That is, it specifies the level of IETF approval necessary for a code point to be allocated for IETF use, the procedures to be used and actions to be taken by IANA in connection with NLPIDs, and related guidelines.

[RFC5226] is incorporated herein except to the extent that there are contrary provisions in this document.

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 [RFC2119].

2. NLPIDs

[ISO9577] defines one-octet network layer protocol identifiers that are commonly called NLPIDs, which is the term used in this document.

NLPIDs are used in a number of protocols. For example, in the mar$pro.type field of the multicast address resolution server protocol [RFC2022], the ar$pro.type field of the NBMA (Non-Broadcast Multi-Access) next hop resolution protocol [RFC2332] and in the IS-IS Protocols Supported TLV [RFC1195]. See Appendix B.

2.1. Sub-Ranges of the NLPID

Sub-ranges of the possible NLPID values are categorized by [ISO9577] for organizations as shown below, primarily for the ISO/IEC (International Organization for Standardization / International Electrotechnical Commission) and the ITU-T (International Telecommunication Union - Telecommunication Standardization Sector):

Code Point	Category
0x00	ISO/IEC
0x01-0x0F	ITU-T
0x10-0x3F	ITU-T Rec. X.25 and ISO/IEC 8208
0x40-0x43	ISO/IEC
0x44	ITU-T
0x45-0x4F	ISO/IEC
0x50-0x6F	ITU-T Rec. X.25 and ISO/IEC 8208
0x70-0x7F	Joint ITU-T and ISO/IEC
0x80	ISO/IEC (see Section 2.2)
0x81-0x8F	ISO/IEC
0x90-0xAF	ITU-T Rec. X.25 and ISO/IEC 8208
0xB0-0xBF	ITU-T
0xC0-0xCF	Potentially available for IANA (see Section 2.3)
0xD0-0xEF	ITU-T Rec. X.25 and ISO/IEC 8208
0xF0-0xFE	Joint ITU-T and ISO/IEC
0xFF	Reserved for an Extension mechanism to be jointly developed by ITU-T and ISO/IEC

2.2. Code Point 0x80

NLPID 0x80 is known as the IEEE (Institute of Electrical & Electronics Engineers) SNAP (SubNetwork Access Protocol) code point. It is followed by five octets, using the IEEE SNAP SAP (Service Access Point) conventions, to specify the protocol. Those conventions are described in Section 3 of [RFC5342]. In particular, it is valid for such a five-octet sequence to start with the IANA OUI (Organizationally Unique Identifier) followed by two further octets assigned by IANA as provided in [RFC5342]. The same IANA registry is used for such protocol identifiers whether they are planned to be introduced by the 0x80 NLPID or the IEEE SNAP SAP LSAPs (Link-Layer Service Access Points) (0xAAAA). Values allocated by IANA may be used in either context as appropriate.

Because of the limited number of NLPID code points available for IANA allocation, use of the IEEE SNAP NLPID is RECOMMENDED rather than allocation of a new one-octet NLPID code point.

2.3. NLPIDs Available for IANA Allocation

A limited number of code points are available that could be allocated by IANA under [ISO9577]. Because of this, it is desirable, where practical, to use code point 0x80, as discussed in Section 2.2 above, or to get code points allocated from the ranges categorized to other organizations. For example, code point 0x8E was allocated for IPv6 [RFC2460], although it is in a range of code points categorized for ISO/IEC. One-byte code points are assigned to TRILL and IEEE 802.1aq as they are intended for use within the IS-IS Protocols Supported TLV [RFC1195].

The table below, which includes two new code point allocations made by this document, shows those still available.

Code Point	Status
0xC0	TRILL [RFC6325]
0xC1	IEEE 802.1aq [802.1aq]
0xC2-0xCB	Available
0xCC	IPv4 [RFC791]
0xCD-0xCE	Available
0xCF	PPP [RFC1661]

3. IANA Considerations

As long as code points are available, IANA will allocate additional values when required by applying the IETF Review policy as per [RFC5226].

Whenever it allocates an NLPID, IANA will inform the IETF liaison to ISO/IEC JTC1 SC6 (Joint Technical Committee 1, Study Committee 6) [JTC1SC6], or if IANA is unable to determine that IETF liaison, the IAB. The liaison (or the IAB) will then ensure that ISO/IEC JTC1 SC6 is informed so that [ISO9577] can be updated since ISO/IEC JTC1 SC6 is the body that maintains [ISO9577]. To simplify this process, it is desirable that the IAB maintain an IETF liaison to ISO/IEC JTC1 SC6.

This document allocates the code points 0xC0 and 0xC1 as shown in Section 2.3 and IANA shall request the liaison (or the IAB) to so inform ISO/IEC JTC1 SC6.

IANA maintains a web page showing NLPIDs that have been allocated to a protocol being developed or extended by the IETF or are otherwise of interest. The initial state of the web page is as shown in Appendix A. IANA will update this web page for (1) NLPIDs allocated by IANA and (2) other allocations or de-allocations when IANA is requested to make such changes to this web page by the IETF liaison mentioned above.

4. Security Considerations

This document is concerned with allocation of NLPIDs. It is not directly concerned with security.

5. References

5.1. Normative References

[ISO9577] International Organization for Standardization "Information technology - Telecommunications and Information exchange between systems - Protocol identification in the network layer", ISO/IEC TR 9577:1999, 1999-12-15.

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

[RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 5226, May 2008.

[RFC5342] Eastlake 3rd., D., "IANA Considerations and IETF Protocol Usage for IEEE 802 Parameters", BCP 141, RFC 5342, September 2008.

[RFC6325] Radia, P., Eastlake, D., Dutt, D., Gai, S., and A. Ghanwani, "RBridges: Base Protocol Specification", RFC 6325, July 2011.

5.2. Informative References

[802.1aq] Standard for Local and Metropolitan Area Networks / Virtual Bridged Local Area Networks / Amendment 9: Shortest Path Bridging, Draft IEEE P802.1aq/D2.1, 21 August 2009.

[JTC1SC6] ISO/IEC JTC1 SC6 (International Organization for Standardization / International Electrotechnical Commission, Joint Technical Committee 1, Study Committee 6), http://www.iso.org/iso/iso_technical_committee.html?commid=45072

[RFC791] Postel, J., "Internet Protocol", STD 5, RFC 791, September 1981.

[RFC1195] Callon, R., "Use of OSI IS-IS for routing in TCP/IP and dual environments", RFC 1195, December 1990.

[RFC1661] Simpson, W., Ed., "The Point-to-Point Protocol (PPP)", STD 51, RFC 1661, July 1994.

[RFC1707] McGovern, M. and R. Ullmann, "CATNIP: Common Architecture for the Internet", RFC 1707, October 1994.

[RFC2022] Armitage, G., "Support for Multicast over UNI 3.0/3.1 based ATM Networks", RFC 2022, November 1996.

[RFC2332] Luciani, J., Katz, D., Piscitello, D., Cole, B., and N. Doraswamy, "NBMA Next Hop Resolution Protocol (NHRP)", RFC 2332, April 1998.

[RFC2460] Deering, S. and R. Hinden, "Internet Protocol, Version 6 (IPv6) Specification", RFC 2460, December 1998.

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Appendix A. Initial IANA NLPID Web Page

NLPIDs of Interest

Code Point	Use
0x00	Null
0x08	Q.933 (RFC 2427)
0x80	IEEE SNAP (RFC 6328)
0x81	ISO CLNP (Connectionless Network Protocol)
0x82	ISO ES-IS
0x83	IS-IS (RFC 1195)
0x8E	IPv6 (RFC 2460)
0xB0	FRF.9 (RFC 2427)
0xB1	FRF.12 (RF C2427)
0xC0	TRILL (RFC 6325)
0xC1	IEEE 802.1aq
0xCC	IPv4 (RFC 791)
0xCF	PPP (RFC 1661)

Note: According to [RFC1707], NLPID 0x70 was assigned to IPv7. That assignment appears to no longer be in effect as it is not listed in ISO/IEC 9577. IPv7 was itself a temporary code point assignment made while a decision was being made between three candidates for the next generation of IP after IPv4. Those candidates were assigned IPv6, IPv7, and IPv8. IPv6 was selected.

Appendix B. RFC References to NLPID

The following RFCs, issued before the end of March 2009, excluding other survey RFCs and obsolete RFCs, reference the NLPID as such:

RFC 1195 Use of OSI IS-IS for Routing in TCP/IP and Dual Environments
RFC 1356 Multiprotocol Interconnect on X.25 and ISDN in the Packet Mode
RFC 1377 The PPP OSI Network Layer Control Protocol (OSINLCP)
RFC 1661 The Point-to-Point Protocol (PPP)
RFC 1707 CATNIP: Common Architecture for the Internet
RFC 1755 ATM Signaling Support for IP over ATM
RFC 2022 Support for Multicast over UNI 3.0/3.1 based ATM Networks
RFC 2332 NBMA Next Hop Resolution Protocol (NHRP)
RFC 2337 Intra-LIS IP multicast among routers over ATM using Sparse Mode PIM
RFC 2363 PPP Over FUNI
RFC 2390 Inverse Address Resolution Protocol
RFC 2427 Multiprotocol Interconnect over Frame Relay
RFC 2590 Transmission of IPv6 Packets over Frame Relay Networks Specification
RFC 2684 Multiprotocol Encapsulation over ATM Adaptation Layer 5
RFC 2955 Definitions of Managed Objects for Monitoring and Controlling the Frame Relay/ATM PVC Service Interworking Function
RFC 3070 Layer Two Tunneling Protocol (L2TP) over Frame Relay
RFC 5308 Routing IPv6 with IS-IS

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