

IANA Considerations for OSPF
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Abstract

This memo creates a number of OSPF registries and provides guidance to IANA for assignment of code points within these registries.

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1. Introduction

This memo defines various OSPF registries for IANA to set up and maintain for OSPF code points. In some cases, this memo defines ranges of code point values within these registries; each such range has a different assignment policy.

The terms used in describing the assignment policies are as follows:

- Standards Action
- Experimentation
- Vendor Private Use
- Reserved

Standards Action means that assignment in that range **MUST** only be made for Standards Track RFCs (as defined in [4]).

A range of values **MAY** be reserved for Experimentation as set out in [9]. Values from this range **MUST NOT** be assigned by IANA. Further guidance on the use of the Experimentation range may be found in paragraphs 4, 5 and 6 of [9]. An implementation **MAY** choose to not support values from the Experimentation range. In such a case, the protocol data structure with a code point from the Experimentation range is ignored, unless other protocol machinery says how to deal with it. (An example of such protocol machinery is the U bit in OSPFv2 Opaque LSAs.) "Ignored" in this context means that the associated data structure is removed from the received packet before further processing, including flooding.

Values set aside as Vendor Private Use **MUST NOT** be assigned by IANA. A protocol data structure whose code point falls in this range **MUST** have a disambiguating field identifying the Vendor. This identifier consists of four octets of the Vendor's SMI enterprise code (see [10]) in network byte order; the location of this code must be well-defined per data structure. An implementation that encounters a Vendor Private code point **SHOULD** check whether the enterprise code is one that it recognises; if so, the implementation **MAY** choose to interpret the code point and data structure. Otherwise, it **SHOULD** ignore the code point, unless protocol machinery says how to deal with the data structure (as defined in the previous paragraph). This allows multiple vendor private extensions to co-exist in a network.

Values in the Reserved range **MUST NOT** be assigned until a Standards Track or Best Common Practices RFC is published defining the assignment policy for that range. This RFC **MUST** be the product of the OSPF Working Group; if the OSPF WG is terminated, then it **MUST** be reviewed by an Expert Reviewer designated by the IESG.

1.1 Conventions used 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 [RFC 2119](#) [[1](#)].

[2.](#) OSPF Registries

This section lists the various registries for OSPF protocol code points. Note that some of these are for OSPF, and some are specific to a particular version of OSPF; also, some registries pre-date this memo.

Registries that are specific to one version of OSPF reflect the version number in the registry name (e.g., OSPFv2 Options). A registry whose name does not mention a version number applies to both OSPFv2 and OSPFv3 (e.g., OSPF Packet Type).

[2.1](#) OSPFv2 Options

(Defined in section A.2 of [\[2\]](#), updated in section A.1 of [\[3\]](#). See also [\[6\]](#).)

Assignment policy: Standards Action.

[2.2](#) OSPFv3 Options

(Defined in section A.2 of [\[5\]](#))

Assignment policy: Standards Action.

[2.3](#) OSPF Packet Type (both v2 and v3)

(Defined in section A.3.1 of [\[2\]](#))

+-----+-----+	
Range	Assignment Policy
+-----+-----+	
0	Not to be assigned
1-5	Already assigned
5-127	Standards Action
128-255	Reserved
+-----+-----+	

[2.3.1](#) OSPF Authentication Type

(Defined in section A.3.1 of [\[2\]](#))

(Note: this registry is called "OSPF AUTHENTICATION CODES" by IANA.)

Range	Assignment Policy
0-2	Already assigned
3-247	Standards Action
248-65519	Reserved
65520-65535	Experimentation

It is unclear at this point if it makes sense to have a Vendor Private Use range for this registry.

2.4 OSPFv2 Link State (LS) Type

(Defined in section A.4.1 of [2])

Range	Assignment Policy
0	Not to be assigned
1-11	Already assigned
12-127	Standards Action
128-255	Reserved

If a new LS Type is documented, the documentation MUST say how the Link State ID is to be filled in, as well as what the flooding scope of the LSA is.

2.4.1 OSPFv2 Router LSA Link Type

(Defined in section A.4.2 of [2])

Range	Assignment Policy
0	Not to be assigned
1-4	Already assigned
5-127	Standards Action

128-255 Reserved	
+-----+-----+	

There is no range for Vendor Private Use, as there is no space for an enterprise code to identify the Vendor.

There is currently no range for Experimental, as it is not clear that such extensions will be backward compatible.

If a new Router LSA Link Type is documented, the documentation SHOULD say how the Link State ID, Link ID and Link Data fields are to be filled in.

[2.4.2](#) OSPFv2 Router Properties

(Defined in section A.4.2 of [\[2\]](#), updated in [\[6\]](#))

This field in the Router LSA is unnamed; it is the field immediately following the Router LSA length.

Assignment policy: Standards Action.

[2.5](#) OSPFv3 LSA Function Code

(Defined in section A.4.2.1 of [\[5\]](#))

Range	Assignment Policy
0	Not to be assigned
1-9	Already assigned
10-255	Standards Action
255-8175	Reserved
8175-8183	Experimentation
8184-8191	Vendor Private Use

In an OSPFv3 LSA with LSA Function Code in the Vendor Private Use range, the first four octets following the 20 octets of LSA header MUST be the Vendor enterprise code.

If a new LSA Function Code is documented, the documentation MUST include the valid combinations of the U, S2 and S1 bits for the LSA.

It SHOULD also say how the Link State ID is to be filled in.

[2.5.1](#) OSPFv3 Prefix Options

(Defined in section A.4.1.1 of [\[5\]](#))

Assignment policy: Standards Action.

[2.5.2](#) OSPFv3 Router LSA Link Type

(Defined in section A.4.3 of [\[5\]](#))

Range	Assignment Policy
0	Not to be assigned
1-4	Already assigned
5-127	Standards Action
128-255	Reserved

There is no range for Vendor Private Use, as there is no space for an enterprise code to identify the Vendor.

There is currently no range for Experimental, as it is not clear that such extensions will be backward compatible.

[2.6](#) OSPFv2 Opaque LSA Type

(Defined in section A.2 of [\[3\]](#))

(Note: this registry is called "OSPF Opaque LSA Option" by IANA. See also [\[8\]](#).)

Range	Assignment Policy
0	Not to be assigned
1-3	Already assigned
4-127	Standards Action
128-247	Reserved

248-251 Experimentation
252-255 Vendor Private Use
+-----+-----+

In an OSPFv2 Opaque LSA with Opaque LSA Type in the Vendor Private Use range, the first four octets of Opaque Information MUST be the Vendor enterprise code.

A document defining a new Standards Track Opaque LSA with TLVs and sub-TLVs MUST describe ranges and assignment policies for these TLVs.

2.6.1 OSPFv2 Grace LSA Top Level TLVs

(Defined in Section A of [\[7\]](#))

+-----+-----+
Range Assignment Policy
+-----+-----+
0 Not to be assigned
1-3 Already assigned
4-255 Standards Action
255-65519 Reserved
65520-65527 Experimentation
65528-65535 Vendor Private Use
+-----+-----+

In a Grace LSA, if a top-level TLV has a Type from the Vendor Private Use range, the Length MUST be at least four, and the first four octets of the Value field MUST be the Vendor enterprise code.

3. Acknowledgments

Many thanks to Adrian Farrel and Acee Lindem for their review and comments.

4. Security Considerations

The lack of adequate IANA guidelines may be viewed as an avenue for Denial of Service attacks on IETF protocols (in this case, OSPFv2 and OSPFv3), and on the IETF Standards Process in general. This memo attempts to close this loophole for OSPFv2 and OSPFv3.

Authors contemplating extensions to OSPF SHOULD examine such extensions carefully, and consider whether new registries are needed, and if so, allocation policies within each registry.

5. IANA Considerations

Done, at last.

6. References

6.1 Normative References

- [1] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [2] Moy, J., "OSPF Version 2", STD 54, [RFC 2328](#), April 1998.
- [3] Coltun, R., "The OSPF Opaque LSA Option", [RFC 2370](#), July 1998.
- [4] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", [BCP 26](#), [RFC 2434](#), October 1998.
- [5] Coltun, R., Ferguson, D. and J. Moy, "OSPF for IPv6", [RFC 2740](#), December 1999.
- [6] Murphy, P., "The OSPF Not-So-Stubby Area (NSSA) Option", [RFC 3101](#), January 2003.
- [7] Moy, J., Pillay-Esnault, P. and A. Lindem, "Graceful OSPF Restart", [RFC 3623](#), November 2003.
- [8] Katz, D., Kompella, K. and D. Yeung, "Traffic Engineering (TE) Extensions to OSPF Version 2", [RFC 3630](#), September 2003.
- [9] Narten, T., "Assigning Experimental and Testing Numbers Considered Useful", [BCP 82](#), [RFC 3692](#), January 2004.

6.2 Informative References

- [10] "PRIVATE ENTERPRISE NUMBERS".

<http://www.iana.org/assignments/enterprise-numbers>

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