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G. Fairhurst
University of Aberdeen

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IANA Assignment of DSCP Pool 3 (xxxx01) Values to require Publication of a Standards Track or Best Current Practice RFC

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Abstract

The Differentiated Services (Diffserv) architecture specifies use of the DSField in the IPv4 and IPv6 packet header to carry the Diffserv Codepoint (DSCP). The Internet Assigned Numbers Authority (IANA) maintains a registry of assigned DSCP values.

This update to RFC2474 changes the IANA assignment method for Pool 3 of the registry (i.e., DSCPs of the form xxxx01) to Standards Action, i.e., values are assigned through a Standards Track or Best Current Practice RFC. The update also removes permission for experimental and Local Use of the codepoints that form Pool 3 of the DSCP registry; Pool 1 codepoints (i.e., DSCPs of the form xxxx11) remain available for these purposes.

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1. Introduction

The Differentiated Services (Diffserv) [RFC2475] architecture (updated by [RFC3260]) provides scalable service differentiation in the Internet. Diffserv uses the six most significant bits of the former IPv4 Type of Service (TOS) octet or the former IPV6 Traffic Class octet to convey the DSField, which is used to carry the Diffserv Codepoint (DSCP). This DSCP value is used to select a Diffserv Per hop Behaviour, PHB.

The six bit DSField is capable of conveying 64 distinct codepoints, and this codepoint space has been divided into three pools for the purpose of codepoint assignment and management (as shown in figure 1). Pool 1 comprises 32 codepoints [RFC2474]. These are assigned by Standards Action, as defined in [RFC8126]. Pool 2 comprises a pool of 16 codepoints reserved for experimental or Local Use (EXP/LU) as defined in [RFC2474], and Pool 3 comprises 16 codepoints [RFC2474], which were initially "available for experimental or local use, but which were indicated should be preferentially utilized for standardized assignments if Pool 1 is ever exhausted."

Pool	Codepoint Space
1	xxxxx0
2	xxxx11
3	xxxx01

Figure 1: Format of the DSField for Codepoints allocated in the three IANA pools (where 'x' refers to either '0' or '1').

At the time of writing this document, 23 of the 32 Pool 1 codepoints have currently been assigned.

Although Pool 1 has not yet been completely exhausted, this document changes the IANA registration policy of Pool 3 to assignment by Standards Action, i.e., values are assigned by Standards Track or Best Current Practice RFCs. The rationale for this update is a need to assign codepoints for particular PHBs that are unable to use any of the unassigned values in Pool 1.

An example is the need to assign a suitable recommended default codepoint for the Lower Effort (LE) per-hop behavior (PHB) [I-D.ietf-tsvwg-le-phb]. The LE PHB is designed to protect best-effort (BE) traffic (packets forwarded with the default PHB) from LE traffic in congestion situations, i.e., when resources become scarce, best-effort traffic has precedence over LE traffic and may preempt it. The continued presence of bleaching of the IP precedence field (setting the top three bits of the former ToS byte to zero) in deployed networks motivates the desire for the LE PHB to use a DSCP with a zero value for the first three bits [I-D.ietf-tsvwg-le-phb]. At the same time, it is also important to reduce the likelihood of priority inversion caused by unintentional re-mapping of other (higher assurance) traffic to the DSCP used for this PHB. The absence of unassigned codepoints in Pool 1 that exhibit these important properties motivates assigning a Pool 3 codepoint as the default that is recommended for use with this PHB.

To allow the IETF to utilise Pool 3 codepoints, this document requests IANA to manage Pool 3 and make assignments for DSCP codepoints in Pool 3 when requested by Standards Action. This assignment method requires publication of a Standards Track or Best Current Practice RFC.

2. Terminology

This document assumes familiarity with the terminology used in [RFC2475] updated by [RFC3260].

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

3. The update to RFC2474

This document updates section 6 of [RFC2474], in the following ways.

It updates the following text concerning the assignment method:

OLD: which are initially available for experimental or local use, but which should be preferentially utilized for standardized assignments if Pool 1 is ever exhausted.

NEW: which are utilized for standardized assignments (replacing the previous availability for experimental or local use)".

It removes the footnote in RFC2474 relating to Pool 3:

DELETE: "(*) may be utilized for future Standards Action allocations as necessary"

The new registry contents are shown in Figure 2.

Pool	Codepoint space	Assignment Policy
1	xxxxx0	Standards Action
2	xxxx11	EXP/LU
3	xxxx01	Standards Action

Figure 2: Updated Assignment Policy for the DSCP Registry

4. Security Considerations

Security considerations for the use of DSCPs are described in the RFCs that define their usage. This document does not present new security considerations.

5. IANA Considerations

This section requests IANA to change the use of Pool 3 in the DSCP registry and to manage this Pool using a Standards Action assignment method.

This requests IANA to make the following changes to the Differentiated Services Field Codepoints (DSCP) Registry, made available at [Registry].

The previous registry text:

3 xxxx01 Experimental or Local Use May be utilized for future Standards Action allocations as necessary.

is replaced with the following registry text:

3 xxxx01 Standards Action.

To manage codepoints in Pool 3, IANA is requested to create and maintain a "Pool 3 Codepoints" entry. Pool 3 of the registry is to be created initially empty, with a format identical to that used for "Pool 1 Codepoints".

The Registration Procedure for use of Pool 3 is "Standards Action" [RFC8126]. IANA is expected to normally make assignments from Pool 1, until this Pool is exhausted, but MAY make assignments from Pool 3 where the format of the codepoint has properties that are needed for a specific PHB. The required characteristics for choosing the DSCP value MUST be explained in the IANA considerations of the document that requests any assignment from Pool 3

IANA is requested to reference RFC3260 and this current document.

6. Acknowledgments

G. Fairhurst received funding from the European Union's Horizon 2020 research and innovation program 2014-2018 under grant agreement No. 644334 (NEAT).

7. References

7.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <http://www.rfc-editor.org/info/rfc2119>.

[RFC2474] Nichols, K., Blake, S., Baker, F. and D. Black, "Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers", RFC 2474, DOI 10.17487/RFC2474, December 1998, <http://www.rfc-editor.org/info/rfc2474>.

[RFC3260] Grossman, D., "New Terminology and Clarifications for Diffserv", RFC 3260, DOI 10.17487/RFC3260, April 2002, <http://www.rfc-editor.org/info/rfc3260>.

7.2. Informative References

[I-D.ietf-tsvwg-le-phb]
Bless, R., "A Lower Effort Per-Hop Behavior (LE PHB)",
Internet-Draft draft-ietf-tsvwg-le-phb-02, June 2017.

[RFC2475] Blake, S., Black, D., Carlson, M., Davies, E., Wang, Z. and W. Weiss, "An Architecture for Differentiated Services", RFC 2475, DOI 10.17487/RFC2475, December 1998, <http://www.rfc-editor.org/info/rfc2475>.

[RFC8126] Cotton, M., Leiba, B. and T. Narten, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 8126, DOI 10.17487/RFC8126, June 2017, <https://www.rfc-editor.org/info/rfc8126>.

[Registry] IANA, "Differentiated Services Field Codepoints (DSCP), https://www.iana.org/assignments/dscp-registry/dscp-registry.xhtml", .

Appendix A. Revision Notes

Note to RFC-Editor: please remove this entire section prior to publication.

This document is an individual submission, seeking adoption by the Transport and Services Working Group (TSVWG).

Individual submission as draft -00.

- This is the initial version of the document.
- Advice in this rev. from Michelle Cotton on the IANA procedure.
- Thanks to Brian Carpenter for helpful inputs to this ID.

Individual submission as draft -01.

- Thanks to Roland Bless for review comments.

Individual submission as draft -02 (author requests adoption as a TSVWG WG draft).

- Thanks to David Black for review comments in preparing rev -02.

Author's Address

Godred Fairhurst
University of Aberdeen
Department of Engineering
Fraser Noble Building
Aberdeen, AB24 3UE
Scotland

Email: gorry@erg.abdn.ac.uk
URI: http://www.erg.abdn.ac.uk/