Transport Area Working Group
Internet-Draft
Updates: 2474 (if approved)
Intended status: Standards Track
Expires: November 24, 2018

G. Fairhurst
University of Aberdeen

May 25, 2018

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

draft-ietf-tsvwg-iana-dscp-registry-06

Abstract

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

This update to RFC2474 changes the IANA assignment policy for Pool 3 of the registry (i.e., DSCP values 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 2 Codepoints (i.e., DSCP values of the form xxxx11) remain available for these purposes.

Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at http://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on November 24, 2018.

Copyright Notice

Table of Contents

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 field, 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 field 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], i.e., values are assigned by Standards Track or Best Current Practice RFCs. 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, which were specified as "initially available for experimental or local use, but which should be preferentially utilized for standardized assignments if Pool 1 is ever exhausted" [RFC2474].

Pool	Codepoint Space
1	xxxxx0
2	xxxx11
3	xxxx01

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

At the time of writing this document, 22 of the 32 Pool 1 codepoints have currently been assigned.

Although Pool 1 has not yet been completely exhausted, there is a need to assign codepoints for particular PHBs that are unable to use any of the unassigned values in Pool 1. 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, allowing these codepoints to be assigned.

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 is allowed to preempt it). The continued presence of bleaching of the IP precedence field in deployed networks can result in setting the first three bits of the former TOS byte to zero (disabling any class-based flow management by routers configured with TOS-based packet processing). There is a need to avoid this remapping of the DSCP for the LE PHB by assigning a codepoint that has a zero value in the first three bits [I-D.ietf-tsvwg-le-phb]. Furthermore, if the LE PHB were to have been assigned one of the currently unused Pool 1 codepoints with a zero value in the first three bits, any bleaching of the IP precedence field would result in other (higher assurance) traffic being also remapped to the assigned DSCP. This remapping could then cause diffserv-marked traffic to receive an unintentional LE treatment for the remainder of the Internet path. It is therefore important to avoid the resulting priority inversion. 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 to manage Pool 3 assignments for DSCP values in Pool 3 via the Standards Action policy [RFC8126]. This assignment policy

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 policy:

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

Note for Pool 2: "Reserved for experimental or Local Use"

Figure 2: Updated Assignment Policy for the DSCP Registry

4. Security Considerations

Security considerations for the use of DSCP values 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 policy.

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

IANA is requested to reference RFC2474 and Section 4 of RFC3260 for the overall format of the DSCP registry.

IANA is requested to reference RFC2474 and Section 4 of RFC3260 for Pool 1.

This update does not modify the IANA registry text for Pool 2. This pool continues to preserve the note shown in Figure 2.

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" subregistry. Pool 3 of the registry is to be created initially empty, with a format identical to that used for "Pool 1 Codepoints".

IANA is requested to reference RFC2474, Section 4 of RFC3260, and the current document for Pool 3.

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

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>.

[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", .

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>.

Appendix A. Revision Notes

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

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.

Working Group submission as draft -00

- Adopted by the TSVWG working group.

Working Group submission as draft -01

- Fixed exploded acronyms.

Working Group submission as draft -02

- Corrections after WGLC.

Working Group submission as draft -03

- Corrections after TSVWG Shepherd Review.

Working Group submission as draft -04

- Added RFC 3260 as a necessary downref, with IANA asked to reference this.

Working Group submission as draft -05

- Corrections following AD review.

- Expansion of explanation about why the proposed change will help in assignment of a suitable DSCP for the LE PHB.

Working Group submission as draft -06

- GenART feedback to changed assignment method to assignment policy,.

- Correction to the IANA reference documents.

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/