Internet Research Task Force (IRTF)
Request for Comments: 6255
Category: Informational
ISSN: 2070-1721

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May 2011

Delay-Tolerant Networking Bundle Protocol IANA Registries

Abstract

The Delay-Tolerant Networking (DTN) Research Group research group has defined many protocols such as the Bundle Protocol and Licklider Transmission Protocol. The specifications of these protocols contain fields that are subject to a registry. For the purpose of its research work, the group created ad hoc registries. As the specifications are stable and have multiple interoperable implementations, the group would like to hand off the registries to IANA for official custody. This document describes the actions executed by IANA.

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1. Introduction

The DTNRG research group has defined many protocols relevant to the DTN architecture [RFC4838] such as the Bundle Protocol [RFC5050] and Licklider Transmission Protocol [RFC5326]. The specifications of these protocols contain fields that are subject to a registry. For the purpose of its research work, the group created ad hoc registries (http://www.dtnrg.org/wiki/AssignedNamesAndNumbers). As the specifications are stable and have multiple interoperable implementations, the group would like to hand off the registries to IANA for official custody. This document describes the actions executed by IANA.

2. Treatment of Flag Fields Encoded Using SDNVs

The DTN protocols use several extensible bit flag fields that are encoded as Self-Delimiting Numeric Values (SDNVs) as defined in Section 4.1 of [RFC5050]. For these fields, the registry specifies the allocation and usage of bit positions within the unencoded field. The SDNV encoding treats the ensemble of bits in the unencoded value as a numeric value to be encoded on transmission and decoded on reception as described in [RFC5050].

Processing of SDNV-encoded flags is discussed in [RFC6256].

Section 4.1 of [RFC5050] specifies that implementations are not required to handle SDNVs with more than 64 bits in their unencoded value. Accordingly, SDNV-encoded flag fields should be limited to 64 bit positions.

IANA registry policies and wording used in this document are described in [RFC5226].

3. Bundle Protocol

The Bundle Protocol (BP) [RFC5050] has fields requiring a registry managed by IANA.

3.1. Bundle Block Types

The Bundle Protocol has a Bundle Block Type code field (Section 4.5.2) [RFC5050]. An IANA registry has been set up as follows.

The registration policy for this registry is:

0-191: Specification Required

192-255: Private or experimental use. No assignment by IANA.

The Value range is: unsigned 8-bit integer.

Bundle Block Type Registry

Value	Description	Reference
0	Reserved	This document
1	Bundle Payload Block	[RFC5050]
2-191	Unassigned	
192-255	Private and/or Experimental Use	[RFC5050]

The value "0" was not defined in any document or in the ad hoc registry. As per consensus by the DTNRG research group, it is reserved per this document.

3.2. Primary Bundle Protocol Version

The Bundle Protocol has a version field (see Section 4.5.1 of [RFC5050]). An IANA registry has been set up as follows.

The registration policy for this registry is: RFC Required

The Value range is: unsigned 8-bit integer.

Primary Bundle Protocol Version Registry

Value	Description	Reference
0-5	Reserved	This document
6	Assigned	[RFC5050]
7-255	Unassigned	

The value "0-5" was not defined in any document or in the ad hoc registry. As per consensus by the DTNRG research group, it is reserved per this document.

3.3. Bundle Processing Control Flags

The Bundle Protocol has a Bundle Processing Control Flags field (see Section 4.2 of [RFC5050]) encoded as an SDNV (see Section 2). An IANA registry has been set up as follows.

The registration policy for this registry is: Specification Required

The Value range is: Variable length. Maximum number of flag bit positions: 64

Bundle Processing Control Flags Registry

Bit Position (right to left)	Description	Reference
0	Bundle is a fragment	[RFC5050]
1	Application data unit is an administrative record	[RFC5050]
2	Bundle must not be fragmented	[RFC5050]
3	Custody transfer is requested	[RFC5050]
4	Destination endpoint is a singleton	[RFC5050]
5	Acknowledgement by application is requested	[RFC5050]
6	Reserved	[RFC5050]
7-8	Class of service: priority	[RFC5050]
9-13	Class of service: reserved	[RFC5050]
14	Request reporting of bundle reception	[RFC5050]
15	Request reporting of custody acceptance	[RFC5050]
16	Request reporting of bundle forwarding	[RFC5050]
17	Request reporting of bundle delivery	[RFC5050]
18	Request reporting of bundle deletion	[RFC5050]
19	Reserved	[RFC5050]
20	Reserved	[RFC5050]
21-63	Unassigned	

3.4. Block Processing Control Flags

The Bundle Protocol has a Block Processing Control Flags field (see Section 4.3 of [RFC5050]). An IANA registry has been set up as follows.

The registration policy for this registry is: Specification Required

The Value range is: Variable length. Maximum number of flag bit positions: 64

Block Processing Control Flags Registry

Bit Position (right to left)	Description	Reference
0	Block must be replicated in every fragment	[RFC5050]
1	Transmit status report if block can't be processed	[RFC5050]
2	Delete bundle if block can't be processed	[RFC5050]
3	Last block	[RFC5050]
4	Discard block if it can't be processed	[RFC5050]
5	Block was forwarded without being processed	[RFC5050]
6	Block contains an EID-reference field	[RFC5050]
7-63	Unassigned	

3.5. Bundle Status Report Flags

The Bundle Protocol has a Status Report Status Flag field (see Section 6.1.1 of [RFC5050]). An IANA registry has been set up as follows.

The registration policy for this registry is: RFC Required

The Value range is: 8 bits.

Bundle Status Report Flags Registry

Value	Description	Reference
00000000	Reserved	This document
00000001	Reporting node received bundle	[RFC5050]
00000010	Reporting node accepted custody of bundle	[RFC5050]
00000100	Reporting node forwarded the bundle	[RFC5050]
00001000	Reporting node delivered the bundle	[RFC5050]
00010000	Reporting node deleted the bundle	[RFC5050]
00100000	Unassigned	
01000000	Unassigned	
10000000	Unassigned	

The value "00000000" was not defined in any document or in the ad hoc registry. As per consensus by the DTNRG research group, it is reserved per this document.

3.6. Bundle Status Report Reason Codes

The Bundle Protocol has a Bundle Status Report Reason Codes field (see Section 6.1.1 of [RFC5050]). An IANA registry has been set up as follows.

The registration policy for this registry is: Specification Required

The Value range is: unsigned 8-bit integer.

Bundle Status Report Reason Codes Registry

Value	Description	Reference
0	No additional information	[RFC5050]
1	Lifetime expired	[RFC5050]
2	Forwarded over unidirectional link	[RFC5050]
3	Transmission canceled	[RFC5050]
4	Depleted storage	[RFC5050]
5	Destination endpoint ID unintelligible	[RFC5050]
6	No known route to destination from here	[RFC5050]
7	No timely contact with next node on route	[RFC5050]
8	Block unintelligible	[RFC5050]
9-254	Unassigned	
255	Reserved	This document

The value "255" was not defined in any document or in the ad hoc registry. As per consensus by the DTNRG research group, it is reserved per this document.

3.7. Bundle Custody Signal Reason Codes

The Bundle Protocol has a Bundle Custody Signal Reason Codes field (see Section 6.1.2 of [RFC5050]). An IANA registry has been set up as follows.

The registration policy for this registry is: Specification Required

The Value range is: unsigned 7-bit integer.

Bundle Custody Signal Reason Codes Registry

Value	Description	Reference
0	No additional information	[RFC5050]
1-2	Unassigned	
3	Redundant reception (reception by a node that is a custodial node for this bundle)	[RFC5050]
4	Depleted storage	[RFC5050]
5	Destination endpoint ID unintelligible	[RFC5050]
6	No known route to destination from here	[RFC5050]
7	No timely contact with next node on route	[RFC5050]
8	Block unintelligible	[RFC5050]
9-126	Unassigned	
127	Reserved	This document

The value "127" was not defined in any document or in the ad hoc registry. As per consensus by the DTNRG research group, it is reserved per this document.

4. Security Considerations

This document requests the creation of registries managed by IANA. There are no security issues involved. Refer to the Security Considerations section of the referenced protocols.

5. IANA Considerations

IANA has created the registries as described in the previous sections.

6. Acknowledgements

The editor would like to thank the following people who have provided comments and suggestions to this document, in no specific order: Stephen Farrell, Daniel Ellard, Scott Burleigh, Keith Scott, and Elwyn Davies.

7. References

7.1. Normative References

[RFC5050] Scott, K. and S. Burleigh, "Bundle Protocol Specification", RFC 5050, November 2007.

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

7.2. Informative References

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[RFC6256] Eddy, W. and E. Davies, "Using Self-Delimiting Numeric Values in Protocols", RFC 6256, May 2011.

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