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Licklider Transmission Protocol (LTP), Compressed Bundle Header Encoding (CBHE), and Bundle Protocol IANA Registries

Abstract

The DTNRG Research Group has defined the experimental Licklider Transmission Protocol (LTP) and the Compressed Bundle Header Encoding (CBHE) mechanism for the InterPlanetary Network (’ipn’ URI scheme). Moreover, RFC 5050 defines values for the Bundle Protocol administrative record type. All of these fields are subject to a registry. For the purpose of its research work, the group has 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 management. This document describes the necessary IANA actions.

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1. Introduction

The DTNRG Research Group has defined the Licklider Transmission Protocol (LTP) [RFC5326]. LTP contains certain fields that are subject to a registry. For the purpose of its research work, the group has 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 management. This document describes the actions that IANA needs to take and uses the well-known IANA policy definitions as described in Section 4.1 of [RFC5226].

The Compressed Bundle Header Encoding (CBHE) [RFC6260] specification defines the concepts of 'Node Number' and 'Service Number' in the 'ipn' URI scheme. In this document, we request formation of IANA registries for these fields.

Because of its association with space communication and the Consultative Committee for Space Data Systems [CCSDS], portions of the "CBHE Node Numbers", "CBHE Service Numbers", and "LTP Engine Numbers" spaces are delegated by this document to the CCSDS Space Assigned Numbers Authority [SANA]. SANA functions similarly to IANA in that it maintains registries of managed values, with a focus on values used by protocols used by CCSDS member agencies.

This document represents the consensus of the DTNRG. It has been discussed and reviewed by the research group and interested parties.

2. 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 [RFC5326] for security issues with LTP.

3. IANA Considerations

IANA has created the registries described in this section.

3.1. Licklider Transmission Protocol

The Licklider Transmission Protocol has fields requiring registries managed by IANA. This document requests the creation of the three registries in this section and requests that they be associated with the other LTP registries.

3.1.1. LTP Cancel Segment Reason Codes

Section 3.2.4 of [RFC5326] defines the reason codes that may be present in Cancel Segments in LTP. IANA has set up a registry to manage the cancel reason codes. This registry, titled "LTP Cancel Segment Reason Codes", has been added to the list of registries associated with the Licklider Transmission Protocol.

The registration policy for this registry is Specification Required.

The initial values (as defined by RFC 5326) for the "LTP Cancel Segment Reason Codes" are:

Value	Description	Reference
0	Client service canceled session	[RFC5326]
1	Unreachable client service	[RFC5326]
2	Retransmission limit exceeded	[RFC5326]
3	Miscolored data received	[RFC5326]
4	System error caused termination	[RFC5326]
5	Retransmission limit exceeded	[RFC5326]
6-255	Unassigned	This document

3.1.2. LTP Engine ID

The Licklider Transmission Protocol has an LTP Engine ID field (Section 2 of [RFC5326]). IANA has set up a registry to manage the Engine IDs. This registry, titled "LTP Engine Numbers", has been added to the list of registries associated with the Licklider Transmission Protocol.

The registration policy for this registry is:

1 -- (2**14)-1 Expert Review required.

(2**14) -- (2**21)-1 Allocated to the Space Assigned Numbers Authority ([SANA]) for use by Consultative Committee for Space Data Systems (CCSDS) missions.

(2**21) -- (2**28)-1 Private or Experimental Use.

(2**28) -- (2**42)-1 First Come First Served basis for requests for less than or equal to 2**14 values to a single entity or organization. Expert Review is required for requests of more than 2**14 values to a single entity or organization.

The LTP Engine ID is expressed as a Self-Delimiting Numeric Value (SDNV) in LTP, and no maximum is specified in the protocol definition. SDNVs are described in Section 4.1 of the Bundle Protocol specification [RFC5050] and in [RFC6256]. The initial values for the "LTP Engine Numbers" registry are:

Value	Description	Reference
0	Reserved	This document
1--(2**14)-1	Unassigned	This document
(2**14)--(2**21)-1	Allocated to CCSDS (SANA)	This document
(2**21)--(2**28)-1	Private/Experimental Use	This document
(2**28)--(2**42)-1	Unassigned	This document
>=(2**42)	Reserved	This document

3.1.3. LTP Client Service ID

The Licklider Transmission Protocol has a client service ID number field (Section 3.2.1 of [RFC5326]). IANA has set up a registry to manage LTP Client Service IDs. This registry, titled "LTP Client Service Identifiers", has been added to the list of registries associated with the Licklider Transmission Protocol.

The registration policy for this registry is:

4 -- (2**14)-1 Allocated to the Space Assigned Numbers Authority ([SANA]) for use by Consultative Committee for Space Data Systems (CCSDS) missions.

2**14 -- 32,767 Private or Experimental Use.

>= 32,768 Specification Required.

The LTP Client Service ID is expressed as a Self-Delimiting Numeric Value (SDNV) in LTP, and no maximum value is specified in the protocol definition. The initial values for the "LTP Client Service Identifiers" are:

Value	Description	Reference
0	Reserved	[RFC5326]
1	Bundle Protocol	This document
2	LTP Service Data Aggregation	This document
3	CCSDS File Delivery Service	This document
4--(2**14)-1	Allocated to CCSDS (SANA)	This document
(2**14)--32,767	Private/Experimental Use	This document
>=32,768	Unassigned	This document

3.2. Compressed Bundle Header Encoding

The CBHE specification [RFC6260] defines concepts of 'Node Number' and 'Service Number' that require registries managed by IANA.

3.2.1. CBHE Node Numbers

The CBHE specification defines a Node Number (node-nbr) field (Section 2.1 of [RFC6260]). IANA has set up a registry to manage CBHE Node Numbers. This registry, titled "CBHE Node Numbers", has been added to the list of registries associated with the Bundle Protocol.

The registration policy for this registry is:

1 -- (2**14)-1 Expert Review required.

(2**14) -- (2**21)-1 Allocated to the Space Assigned Numbers Authority ([SANA]) for use by Consultative Committee for Space Data Systems (CCSDS) missions.

(2**21) -- (2**28)-1 Private or Experimental Use.

(2**28) -- (2**42)-1 First Come First Served basis for requests for less than or equal to 2**14 values to a single entity or organization. Expert Review is required for requests of more than 2**14 values to a single entity or organization.

>= (2**42) Reserved.

The CBHE Node Number is expressed as a Self-Delimiting Numeric Value (SDNV) in the CBHE specification. Allowable values for the Node Number range from 1 -- (2**64)-1. The initial values for the "CBHE Node Number" registry shall be:

Value	Description	Reference
0	Reserved	This document
1--(2**14)-1	Unassigned	This document
(2**14)--(2**21)-1	Allocated to CCSDS (SANA)	This document
(2**21)--(2**28)-1	Private/Experimental Use	This document
(2**28)--(2**42)-1	Unassigned	This document
>=(2**42)	Reserved	This document

3.2.2. CBHE Service Numbers

The Compressed Bundle Header Encoding specification defines a Service Number (service-nbr) field (Section 2.1 of [RFC6260]). IANA has set up a registry to manage CBHE Service Numbers. This registry, titled "CBHE Service Numbers", has been added to the list of registries associated with the Bundle Protocol.

The registration policy for this registry is:

0-63 Specification Required.

64-1023 Allocated to the Space Assigned Numbers Authority ([SANA]) for use by Consultative Committee for Space Data Systems (CCSDS) missions.

1024 - 2**16-1 Specification Required.

>= 2**16 Private/Experimental Use.

The CBHE Service Number is expressed as a Self-Delimiting Numeric Value (SDNV) in the CBHE specification. Allowable values for the Service Number range from 1 -- (2**64)-1. The initial values for the "CBHE Service Number" registry are:

Value	Description	Reference
0	Bundle Protocol Administrative Record	[RFC6260]
1	CCSDS File Delivery Service	[CFDP]
2	Reserved	This document
3-63	Unassigned	This document
64-1023	Allocated to CCSDS (SANA)	This document
1024 - 2**16-1	Unassigned	This document
>=2**16	Private/Experimental Use	This document

3.3. Bundle Administrative Record Types

Section 6.1 of the Bundle Protocol specification [RFC5050] specifies a 4-bit Administrative Record type code. IANA has set up a registry to manage these record types. This registry, titled "Bundle Administrative Record Types", has been added to the list of registries associated with the Bundle Protocol.

The registration policy for this registry is Specification Required.

The initial values for the "Bundle Administrative Record Type" registry are:

Value	Description	Reference
0	Reserved	This document
1	Bundle status report	[RFC5050]
2	Custody signal	[RFC5050]
3-15	Unassigned	This document

4. Acknowledgements

The authors would like to thank the following people, in no specific order: Scott Burleigh, Stephen Farrell, and John Buford.

5. References

5.1. Normative References

[CFDP] Consultative Committee for Space Data Systems, "CCSDS File Delivery Protocol Version 4 (CCSDS 727.0-B-4)", January 2007, <http://www.ccsds.org>.

[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.

[RFC5326] Ramadas, M., Burleigh, S., and S. Farrell, "Licklider Transmission Protocol - Specification", RFC 5326, September 2008.

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

[RFC6260] Burleigh, S., "Compressed Bundle Header Encoding (CBHE)", RFC 6260, May 2011.

5.2. Informative References

[CCSDS] CCSDS, "The Consultative Committee for Space Data Systems", <http://www.ccsds.org>.

[SANA] SANA, "The CCSDS SANA Registry page", <http://sanaregistry.org>.

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