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TLV Naming in the MANET Generalized Packet/Message Format
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Abstract

TLVs (type-length-value structures) as defined by RFC5444 have both a type (one octet) and a type extension (one octet), together forming a full type (of two octets). RFC5444 sets up IANA registries for TLV types, specifying that an allocation of a TLV type entails creation of an IANA registry for the corresponding type extensions.

In some cases, reserving all 256 type extensions for use for a common purpose for a given TLV is meaningful, and thus it makes sense to record a common name for such a TLV type (and all of its type extensions) in the corresponding IANA registries. An example of such is a LINK_METRIC TLV Type, with its type extensions reserved for use to be indicating the "kind" of metric expressed by the value of the TLV.

In some other cases, there may not be 256 full types that share a common purpose and, as such, it is not meaningful to record a common name for all the type extensions for a TLV type in the corresponding IANA registries. Rather, it is appropriate to record an individual name per full type.

This document reorganizes the naming of already allocated TLV types and type extensions in those registries to use names appropriately. It has no consequences in terms of any protocol implementation.

This document also updates the Expert Review guidelines from RFC5444, so as to establish a policy for consistent naming of future TLV type and type extension allocations. It makes no other changes to RFC5444.

Status of this Memo

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1. Introduction

This document reorganizes and rationalizes the naming of TLVs (type-length-value structures), defined by [RFC5444] and recorded by IANA in the Mobile Ad hoc NETwork (MANET) Parameters registries "Packet TLV Types", "Message TLV Types", and "Address Block TLV Types".

This document reorganizes the naming of already allocated Packet, Message and Address Block TLV types, and their corresponding Type Extensions, and updates corresponding IANA registries.

TLVs have a type (one octet) and a type extension (one octet) which together form a full type (of two octets). A TLV may omit the type extension when it is zero, but that applies only to its representation, it still has a type extension of zero. A TLV type defines an IANA registry of type extensions for that type.

There have been two forms of TLV allocation.

The first, but less common, form of allocation has been that allocation of the type has immediately defined (but not necessarily allocated) all the corresponding type extensions for versions of that type. This applies, for example, to the Address Block TLV LINK_METRIC specified in [RFC7181]. The LINK_METRIC type extensions are all available for allocation for different definitions of link metric. It is appropriate in this case to apply the name LINK_METRIC to the type, and also to all the full types corresponding to that type, as has been done. Type extensions can then be individually named, or can be simply referred to by their number.

The second, more common, form of allocation has been that for a TLV type, only type extension 0, and possibly the type extension 1, are defined. An example is the Address Block TLV LINK_STATUS defined in [RFC6130], where only type extension 0 is allocated. It is not reasonable to assume that the remaining 255 type extensions will be allocated to forms of LINK_STATUS. (Other forms of link status are already catered to by the introduction, in [RFC7188], of a registry for values of the LINK_STATUS TLV.) Thus the name LINK_STATUS should be attached to that specific type extension for that type, i.e., to the full type, and not to the TLV type when used with all other type extensions therefore. This was, however, not done as part of the initial registration of this TLV type. Effectively, this leaves, for the LINK_STAUS TLV type, the type extensions 1-255 either unavailable for allocation (if applying strictly the interpretation that they must relate to a LINK_STATUS), or counterintuitively named for their intended function.

The purpose of this document is to change how these names are applied, and recorded in IANA registries, and to provide guidelines and instructions for future TLV type allocations. This is to facilitate the addition of new TLVs using type extensions other than 0, but without them having inappropriate names attached. So, for example, LINK_STATUS will become the name of the full type (as composed by the TLV type 3 and the TLV type extension 0), and will cease being the name of the TLV type 3. This leaves the question of how to name the type. As it is not clear what other TLVs might be defined for other type extensions of the same type, it is proposed to leave the type currently unnamed, specified only by number.

This document also updates the Expert Review guidelines from [RFC5444], so as to establish a policy for consisteng naming of future TLV type and type extension allocations.

For clarity, all currently allocated TLVs in [RFC5497], [RFC6130], [RFC7181] and [RFC7182] will be listed in the IANA considerations section of this document, indicating no change when that is appropriate (such as the LINK_METRIC TLV). The only changes are of naming.

Note that nothing in this draft changes the operation of any protocol. This naming is already used, in effect, in [RFC6130] and [RFC7181], currently the main users of allocated TLVs. For example the former indicates that all usage of LINK_STATUS refers to that TLV with type extension 0.

2. Terminology

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].

All references to elements such as packet, message and TLV in this document refer to those defined in [RFC5444].

3. IANA Considerations

This document updates the Expert Review evaluation guidelines for Packet TLV Type, Message TLV Type, and Address Block TLV Type allocations, from [RFC5444], and updates the registries for already made allocations to follow these guidelines.

3.1. Expert Review: Evaluation Guidelines

For registration from the registries for Packet TLV Types, Message TLV Types, and Address Block TLV Types, the following guidelines apply, in addition to those given in section 6.1 in [RFC5444]:

- If the reguested TLV Type immediately defines (but not necessarily allocates) all the corresponding type extensions for versions of that type, then a common name SHOULD be assigned for the TLV type.

- Otherwise, if the reguested TLV Type does not immediately define all the corresponding type extensions for versions of that type, then a common name SHOULD NOT be assigned for that TLV type. Instead, it is RECOMMENDED that:

  * The "description" for the allocated TLV type be "Defined by Type Extension";

  * For Packet TLV Types, that the Type Extension registry, created for the TLV Type, be named "Type XX Packet TLV Type Extensions", with XX replaced by the numerical value of the TLV Type.

  * For Message TLV Types, that the Type Extension registry, created for the TLV Type, be named "Type XX Message TLV Type Extensions", with XX replaced by the numerical value of the TLV Type.

  * For Address Block TLV Types, that the Type Extension registry, created for the TLV Type, be named "Type XX Address Block TLV Type Extensions", with XX replaced by the numerical value of the TLV Type.

  * That each Type Extension be given a name when allocated.

3.2. Updated IANA Registries

The following changes all apply to the IANA registry "Mobile Ad hoc NETwork (MANET) Parameters".

The IANA registry "Packet TLV Types" is unchanged.

The IANA Registry "ICV Packet TLV Type Extensions" is unchanged.

The IANA Registry "TIMESTAMP Packet TLV Type Extensions" is unchanged.

The IANA Registry "Message TLV Types" is changed to Table 1.

Type	Description	Reference
0	Defined by Type Extension	[RFC5497]
1	Defined by Type Extension	[RFC5497]
2-4	Unassigned	
5	ICV	[RFC7182]
6	TIMESTAMP	[RFC7182]
7	Defined by Type Extension	[RFC7181]
8	Defined by Type Extension	[RFC7181]
9-223	Unassigned	
224-255	Reserved for Experimental Use	[RFC5444]

Table 1: Message TLV Types

The IANA Registry "INTERVAL_TIME Message TLV Type Extensions" is renamed as "Type 0 Message TLV Type Extensions" and changed to Table 2.

Type Extension	Name	Description	Reference
0	INTERVAL_TIME	The maximum time before another message of the same type as this message from the same originator should be received	[RFC5497]
1-223		Unassigned	
224-255		Reserved for Experimental Use	[RFC5497]

Table 2: Type 0 Message TLV Type Extensions

The IANA Registry "VALIDITY_TIME Message TLV Type Extensions" is renamed as "Type 1 Message TLV Type Extensions" and changed to Table 3.

Type Extension	Name	Description	Reference
0	VALIDITY_TIME	The time from receipt of the message during which the information contained in the message is to be considered valid	[RFC5497]
1-223		Unassigned	
224-255		Reserved for Experimental Use	[RFC5497]

Table 3: Type 1 Message TLV Type Extensions

The IANA Registry "ICV Message TLV Type Extensions" is unchanged.

The IANA Registry "TIMESTAMP Message TLV Type Extensions" is unchanged.

The IANA Registry "MPR_WILLING Message Type Extensions" is renamed as "Type 7 Message TLV Type Extensions" and changed to Table 4.

Type Extension	Name	Description	Reference
0	MPR_WILLING	Bits 0-3 specify the originating router's willingness to act as a flooding MPR; bits 4-7 specify the originating router's willingness to act as a routing MPR	[RFC7181]
1-223		Unassigned	
224-255		Reserved for Experimental Use	[RFC7181]

Table 4: Type 7 Message TLV Type Extensions

The IANA Registry "CONT_SEQ_NUM Message Type Extensions" is renamed as "Type 8 Message TLV Type Extensions" and changed to Table 5.

Type Extension	Name	Description	Reference
0	CONT_SEQ_NUM (COMPLETE)	Specifies a content sequence number for this complete message	[RFC7181]
1	CONT_SEQ_NUM (INCOMPLETE)	Specifies a content sequence number for this incomplete message	[RFC7181]
2-223		Unassigned	
224-255		Reserved for Experimental Use	[RFC7181]

Table 5: Type 8 Message TLV Type Extensions

The IANA Registry "Address Block TLV Types" is changed to Table 6.

Type	Description	Reference
0	Defined by Type Extension	[RFC5497]
1	Defined by Type Extension	[RFC5497]
2	Defined by Type Extension	[RFC6130]
3	Defined by Type Extension	[RFC6130]
4	Defined by Type Extension	[RFC6130]
5	ICV	[RFC7182]
6	TIMESTAMP	[RFC7182]
7	LINK_METRIC	[RFC7181]
8	Defined by Type Extension	[RFC7181]
9	Defined by Type Extension	[RFC7181]
10	Defined by Type Extension	[RFC7181]
11-223	Unassigned	
224-255	Reserved for Experimental Use	[RFC5444]

Table 6: Address Block TLV Types

The IANA Registry "INTERVAL_TIME Address Block TLV Type Extensions" is renamed as "Type 0 Address Block TLV Type Extensions" and changed to Table 7.

Type Extension	Name	Description	Reference
0	INTERVAL_TIME	The maximum time before another message of the same type as this message from the same originator and containing this address should be received	[RFC5497]
1-223		Unassigned	
224-255		Reserved for Experimental Use	[RFC5497]

Table 7: Type 0 Address Block TLV Type Extensions

The IANA Registry "VALIDITY_TIME Address Block Type Extensions" is renamed as "Type 1 Address Block TLV Type Extensions" and changed to Table 8.

Type Extension	Name	Description	Reference
0	VALIDITY_TIME	The time from receipt of the address during which the information regarding this address is to be considered valid	[RFC5497]
1-223		Unassigned	
224-255		Reserved for Experimental Use	[RFC5497]

Table 8: Type 1 Address Block TLV Type Extensions

The IANA Registry "LOCAL_IF Address Block Type Extensions" is renamed as "Type 2 Address Block TLV Type Extensions" and changed to Table 9.

Type Extension	Name	Description	Reference
0	LOCAL_IF	This value is to be interpreted according to the registry [LOCAL_IF TLV Values]	[RFC7188][RFC6130]
1-223		Unassigned	
224-255		Reserved for Experimental Use	[RFC6130]

Table 9: Type 2 Address Block TLV Type Extensions

The IANA Registry "LINK_STATUS Address Block Type Extensions" is renamed as "Type 3 Address Block TLV Type Extensions" and changed to Table 10.

Type Extension	Name	Description	Reference
0	LINK_STATUS	This value is to be interpreted according to the registry [LINK_STATUS TLV Values]	[RFC7188][RFC6130]
1-223		Unassigned	
224-255		Reserved for Experimental Use	[RFC6130]

Table 10: Type 3 Address Block TLV Type Extensions

The IANA Registry "OTHER_NEIGHB Address Block Type Extensions" is renamed as "Type 4 Address Block TLV Type Extensions" and changed to Table 11.

Type Extension	Name	Description	Reference
0	OTHER_NEIGHB	This value is to be interpreted according to the registry [OTHER_NEIGHB TLV Values]	[RFC7188][RFC6130]
1-223		Unassigned	
224-255		Reserved for Experimental Use	[RFC6130]

Table 11: Type 4 Address Block TLV Type Extensions

The IANA Registry "ICV Address Block TLV Type Extensions" is unchanged.

The IANA Registry "TIMESTAMP Address Block TLV Type Extensions" is unchanged.

The IANA Registry "LINK_METRIC Address Block TLV Type Extensions" is unchanged.

The IANA Registry "MPR Address Block Type Extensions" is renamed as "Type 8 Address Block TLV Type Extensions" and changed to Table 12.

Type Extension	Name	Description	Reference
0	MPR	This value is to be interpreted according to the registry [MPR TLV Bit Values]	[RFC7188][RFC7181]
1-223		Unassigned	
224-255		Reserved for Experimental Use	This Document

Table 12: Type 8 Address Block TLV Type Extensions

The IANA Registry "NBR_ADDR_TYPES Address Block Type Extensions" is renamed as "Type 9 Address Block TLV Type Extensions" and changed to Table 13.

Type Extension	Name	Description	Reference
0	NBR_ADDR_TYPES	This value is to be interpreted according to the registry [NBR_ADDR_TYPE Address Block TLV Bit Values]	[RFC7188][RFC7181]
1-223		Unassigned	
224-255		Reserved for Experimental Use	This Document

Table 13: Type 9 Address Block TLV Type Extensions

The IANA Registry "GATEWAY Address Block Type Extensions" is renamed as "Type 10 Address Block TLV Type Extensions" and changed to Table 14.

Type Extension	Name	Description	Reference
0	GATEWAY	Specifies that a given network address is reached via a gateway on the originating router, with value equal to the number of hops	[RFC7188][RFC7181]
1-223		Unassigned	
224-255		Reserved for Experimental Use	This Document

Table 14: Type 10 Address Block TLV Type Extensions

Note: This document adds reservations for experimental use, omitted in [RFC7181], to the last three tables.

4. Security Considerations

As this document is concerned only with how entities are named, those names being used only in documents such as this and IANA registries, this document has no security considerations.

5. Acknowledgments

The authors would like to thank Adrian Farrel for having pointed out the need for reorganization and rationalization the naming of TLVs (type-length-value structures), defined by [RFC5444].

6. Normative References

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