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Abstract

The Network Time Protocol (NTP) and Network Time Security (NTS) documents define a number of assigned number registries, collectively called the NTP registries. Some registries have wrong values, some registries do not follow current common practice, and some are just right. For the sake of completeness, this document reviews all NTP and NTS registries.

Discussion Venues

This note is to be removed before publishing as an RFC.

Source for this draft and an issue tracker can be found at <https://github.com/richsalz/draft-rsalz-update-registries>.

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Internet-Draft

The update registries draft

February 2021

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Table of Contents

1.	Introduction	2
2.	Existing Registries	3
2.1.	Reference ID, Kiss-o'-Death	3
2.2.	Extension Field Types	3
2.3.	Network Time Security Registries	4
3.	New Registries	4
4.	IANA Considerations	4
4.1.	NTP Reference Identifier Codes	4
4.2.	NTP Kiss-o'-Death Codes	5
4.3.	NTP Extension Field Types	5
4.4.	Network Time Security Key Establishment Record Types . .	9
4.5.	Network Time Security Next Protocols	9
4.6.	Network Time Security Error Codes	9
4.7.	Network Time Security Warning Codes	9
5.	Acknowledgements	10
6.	Normative References	10
	Author's Address	11

[1.](#) Introduction

The Network Time Protocol (NTP) and Network Time Security (NTS) documents define a number of assigned number registries, collectively called the NTP registries. Some registries have wrong values, some registries do not follow current common practice, and some are just right. For the sake of completeness, this document reviews all NTP and NTS registries.

The bulk of this document can be divided into two parts:

- * First, each registry, its defining document, and a summary of its syntax is defined.

- * Second, the revised format and entries for each registry are defined.

[2.](#) Existing Registries

This section describes the registries and the rules for them. It is intended to be a short summary of the syntax and registration requirements for each registry. The semantics and protocol processing rules for each registry -- that is, how an implementation acts when sending or receiving any of the fields -- is not described here.

[2.1.](#) Reference ID, Kiss-o'-Death

[RFC5905] defined two registries, the Reference ID in [Section 7.3](#), and the Kiss-o'-Death in [Section 7.4](#). Both of these are allowed to be four ASCII characters; padded on the right with all-bits-zero if necessary. Entries that start with 0x58, the ASCII letter uppercase X, are reserved for private experimentation and development. Both registries are first-come first-served. The formal request to define the registries is in [Section 16](#).

[Section 7.5 of \[RFC5905\]](#) defined the on-the-wire format of extension fields but did not create a registry for it.

[2.2.](#) Extension Field Types

[RFC5906] mentioned the Extension Field Types registry, and defined it indirectly by defining 30 extensions (15 each for request and response) in [Section 13](#). It did not provide a formal definition of the columns in the registry. [Section 10 of \[RFC5906\]](#) splits the Field Type into four subfields, only for use within the Autokey extensions.

[RFC7821] added a new entry, Checksum Complement, to the Extension Field Types registry.

[RFC7822] clarified the processing rules for Extension Field Types, particularly around the interaction with the Message Authentication

Code (MAC) field.

[RFC8573] changed the cryptography used in the MAC field.

The following problems exists with the current registry:

- * Many of the entries in the Extension Field Types registry have swapped some of the nibbles; 0x1234 is listed as 0x1432 for example. This document marks the erroneous values as reserved.
- * Some values were mistakenly re-used.

Salz

Expires 7 August 2021

[Page 3]

Internet-Draft

The update registries draft

February 2021

[2.3.](#) Network Time Security Registries

[RFC8915] defines the Network Time Security (NTS) protocol. Sections 7.1 through 7.5 (inclusive) added entries to existing registries.

[Section 7.6](#) created a new registry, NTS Key Establishment Record Types, that partitions the assigned numbers into three different registration policies: IETF Review, Specification Required, and Private or Experimental Use.

[Section 7.7](#) created a new registry, NTS Next Protocols, that similarly partitions the assigned numbers.

[Section 7.8](#) created two new registries, NTS Error Codes and NTS Warning Codes. Both registries are also partitioned the same way.

[3.](#) New Registries

The following general guidelines apply to all registries defined here:

- * Every entry reserves a partition for private use and experimentation.
- * Registries with ASCII fields are now limited to uppercase letters; fields starting with 0x2D, the ASCII minus sign, are reserved for private use and experimentation.
- * The policy for every registry is now specification required, as

defined in [Section 4.6 of \[RFC8126\]](#).

The IESG is requested to choose three designated experts, with two being required to approve a registry change.

Each entry described in the below sub-sections is intended to completely replace the existing entry with the same name.

[4.](#) IANA Considerations

[4.1.](#) NTP Reference Identifier Codes

The registration procedure is changed to specification required.

The Note is changed to read as follows:

- * Codes beginning with the character "-" are reserved for experimentation and development. IANA cannot assign them.

Salz

Expires 7 August 2021

[Page 4]

Internet-Draft

The update registries draft

February 2021

The columns are defined as follows:

- * ID (required): a four-byte value padded on the right with zero's. Each value must be an ASCII uppercase letter or minus sign
- * Clock source (required): A brief text description of the ID
- * Reference (required): the publication defining the ID.

The existing entries are left unchanged.

[4.2.](#) NTP Kiss-o'-Death Codes

The registration procedure is changed to specification required.

The Note is changed to read as follows:

- * Codes beginning with the character "-" are reserved for experimentation and development. IANA cannot assign them.

The columns are defined as follows:

- * ID (required): a four-byte value padded on the right with zero's. Each value must be an ASCII uppercase letter or minus sign.
- * Meaning source (required): A brief text description of the ID.
- * Reference (required): the publication defining the ID.

The existing entries are left unchanged.

4.3. NTP Extension Field Types

The registration procedure is changed to specification required.

The reference should be [[RFC5906](#)] added, if possible.

The following Note is added:

- * Field Types in the range 0xF000 through 0xFFFF, inclusive, are reserved for experimentation and development. IANA cannot assign them. Both NTS Cookie and Autokey Message Request have the same Field Type; in practice this is not a problem as the field semantics will be determined by other parts of the message.

The columns are defined as follows:

- * Field Type (required): A two-byte value in hexadecimal.

- * Meaning (required): A brief text description of the field type.
- * Reference (required): the publication defining the field type.

The table is replaced with the following entries.

Field Type	Meaning	Reference
0x0002	Reserved for historic reasons	This RFC
0x0102	Reserved for historic reasons	This RFC
0x0104	Unique Identifier	RFC 8915 , Section 5.3

0x0200	No-Operation Request	RFC 5906
0x0201	Association Message Request	RFC 5906
0x0202	Certificate Message Request	RFC 5906
0x0203	Cookie Message Request	RFC 5906
0x0204	NTS Cookie	RFC 8915 , Section 5.4
0x0204	Autokey Message Request	RFC 5906
0x0205	Leapseconds Message Request	RFC 5906
0x0206	Sign Message Request	RFC 5906
0x0207	IFF Identity Message Request	RFC 5906
0x0208	GQ Identity Message Request	RFC 5906
0x0209	MV Identity Message Request	RFC 5906
0x0302	Reserved for historic reasons	This RFC
0x0304	NTS Cookie Placeholder	RFC 8915 , Section 5.5
0x0402	Reserved for historic reasons	This RFC
0x0404	NTS Authenticator and Encrypted Extension Fields	RFC 8915 , Section 5.6

0x0502	Reserved for historic reasons	This RFC
0x0602	Reserved for historic reasons	This RFC
0x0702	Reserved for historic reasons	This RFC
0x2005	Reserved for historic reasons	This RFC

0x8002	Reserved for historic reasons	This RFC	
0x8102	Reserved for historic reasons	This RFC	
0x8200	No-Operation Response	RFC 5906	
0x8201	Association Message Response	RFC 5906	
0x8202	Certificate Message Response	RFC 5906	
0x8203	Cookie Message Response	RFC 5906	
0x8204	Autokey Message Response	RFC 5906	
0x8205	Leapseconds Message Response	RFC 5906	
0x8206	Sign Message Response	RFC 5906	
0x8207	IFF Identity Message Response	RFC 5906	
0x8208	GQ Identity Message Response	RFC 5906	
0x8209	MV Identity Message Response	RFC 5906	
0x8302	Reserved for historic reasons	This RFC	
0x8402	Reserved for historic reasons	This RFC	
0x8502	Reserved for historic reasons	This RFC	
0x8602	Reserved for historic reasons	This RFC	
0x8702	Reserved for historic reasons	This RFC	
0x8802	Reserved for historic reasons	This RFC	
0xC002	Reserved for historic reasons	This RFC	
0xC102	Reserved for historic reasons	This RFC	

0xC200	No-Operation Error Response	RFC 5906	
+-----+	+-----+	+-----+	+-----+
0xC201	Association Message Error Response	RFC 5906	
+-----+	+-----+	+-----+	+-----+
0xC202	Certificate Message Error Response	RFC 5906	
+-----+	+-----+	+-----+	+-----+
0xC203	Cookie Message Error Response	RFC 5906	
+-----+	+-----+	+-----+	+-----+
0xC204	Autokey Message Error Response	RFC 5906	
+-----+	+-----+	+-----+	+-----+
0xC205	Leapseconds Message Error Response	RFC 5906	
+-----+	+-----+	+-----+	+-----+
0xC206	Sign Message Error Response	RFC 5906	
+-----+	+-----+	+-----+	+-----+
0xC207	IFF Identity Message Error Response	RFC 5906	
+-----+	+-----+	+-----+	+-----+
0xC208	GQ Identity Message Error Response	RFC 5906	
+-----+	+-----+	+-----+	+-----+
0xC209	MV Identity Message Error Response	RFC 5906	
+-----+	+-----+	+-----+	+-----+
0xC302	Reserved for historic reasons	This RFC	
+-----+	+-----+	+-----+	+-----+
0xC402	Reserved for historic reasons	This RFC	
+-----+	+-----+	+-----+	+-----+
0xC502	Reserved for historic reasons	This RFC	
+-----+	+-----+	+-----+	+-----+
0xC602	Reserved for historic reasons	This RFC	
+-----+	+-----+	+-----+	+-----+
0xC702	Reserved for historic reasons	This RFC	
+-----+	+-----+	+-----+	+-----+
0xC802	Reserved for historic reasons	This RFC	
+-----+	+-----+	+-----+	+-----+
0x0902	Reserved for historic reasons	This RFC	
+-----+	+-----+	+-----+	+-----+
0x8902	Reserved for historic reasons	This RFC	
+-----+	+-----+	+-----+	+-----+
0xC902	Reserved for historic reasons	This RFC	
+-----+	+-----+	+-----+	+-----+

Table 1

[4.4.](#) Network Time Security Key Establishment Record Types

The registration procedure is changed to specification required.

The following note should be added:

- * Record Type numbers in the range 0x4000 through 0x7FFF, inclusive, are reserved for experimentation and development. IANA cannot assign them.

The existing entries are left unchanged.

[4.5.](#) Network Time Security Next Protocols

The registration procedure is changed to specification required.

The following note should be added:

- * Protocol ID numbers in the range 0x8000 through 0xFFFF, inclusive, are reserved for experimentation and development. IANA cannot assign them.

The existing entries are left unchanged.

[4.6.](#) Network Time Security Error Codes

The registration procedure is changed to specification required.

The following note should be added:

- * Error code numbers in the range 0x8000 through 0xFFFF, inclusive, are reserved for experimentation and development. IANA cannot assign them.

The existing entries are left unchanged.

[4.7.](#) Network Time Security Warning Codes

The registration procedure is changed to specification required.

The following note should be added:

- * Warning code numbers in the range 0x8000 through 0xFFFF, inclusive, are reserved for experimentation and development. IANA cannot assign them.

The existing entries are left unchanged.

[5.](#) Acknowledgements

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- * Miroslav Lichvar, RedHat
- * Daniel Franke, Akamai Technologies
- * Danny Mayer, Network Time Foundation
- * Michelle Cotton, IANA

And thanks to Harlen Stenn for providing popcorn.

[6.](#) Normative References

- [RFC5905] Mills, D., Martin, J., Ed., Burbank, J., and W. Kasch, "Network Time Protocol Version 4: Protocol and Algorithms Specification", [RFC 5905](#), DOI 10.17487/RFC5905, June 2010, <<https://www.rfc-editor.org/info/rfc5905>>.
- [RFC5906] Haberman, B., Ed. and D. Mills, "Network Time Protocol Version 4: Autokey Specification", [RFC 5906](#), DOI 10.17487/RFC5906, June 2010, <<https://www.rfc-editor.org/info/rfc5906>>.
- [RFC7821] Mizrahi, T., "UDP Checksum Complement in the Network Time Protocol (NTP)", [RFC 7821](#), DOI 10.17487/RFC7821, March 2016, <<https://www.rfc-editor.org/info/rfc7821>>.
- [RFC7822] Mizrahi, T. and D. Mayer, "Network Time Protocol Version 4 (NTPv4) Extension Fields", [RFC 7822](#), DOI 10.17487/RFC7822, March 2016, <<https://www.rfc-editor.org/info/rfc7822>>.
- [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>>.

[RFC8573] Malhotra, A. and S. Goldberg, "Message Authentication Code for the Network Time Protocol", [RFC 8573](#), DOI 10.17487/RFC8573, June 2019, <<https://www.rfc-editor.org/info/rfc8573>>.

Salz

Expires 7 August 2021

[Page 10]

Internet-Draft

The update registries draft

February 2021

[RFC8915] Franke, D., Sibold, D., Teichel, K., Dansarie, M., and R. Sundblad, "Network Time Security for the Network Time Protocol", [RFC 8915](#), DOI 10.17487/RFC8915, September 2020, <<https://www.rfc-editor.org/info/rfc8915>>.

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Salz

Expires 7 August 2021

[Page 11]