

ntp  
Internet-Draft  
Updates: [5905](#), [5906](#), [8573](#), [7822](#), [7821](#) (if  
approved)  
Intended status: Informational  
Expires: 18 April 2022

R. Salz  
Akamai Technologies  
15 October 2021

Updating the NTP Registries  
draft-ietf-ntp-update-registries-03

## 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.

This document updates [RFC 5905](#), [RFC 5906](#), [RFC 8573](#), [RFC 7822](#), and [RFC 7821](#).

## Notes

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

This document is a product of the NTP Working Group (<https://dt.ietf.org/wg/ntp>). Source for this draft and an issue tracker can be found at <https://github.com/richsalz/draft-rsalz-update-registries>.

RFC Editor: Please update 'this RFC' to refer to this document, once its RFC number is known, through the document.

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## [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 that is being modified is specified.

## [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 or Experimental Use. Both registries are first-come first-served. The formal request to define the registries is in [Section 16](#).

[\[RFC5905\]](#), [Section 7.5](#) 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. [\[RFC5906\]](#), [Section 10](#) 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:

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- \* 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.

### [2.3](#). Network Time Security Registries

[RFC8915] defines the NTS protocol. Its registries are listed here for completeness, but no changes to them are specified in this document.

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](#). Updated Registries

The following general guidelines apply to all registries updated

here:

- \* Every entry reserves a partition for Private or Experimental Use.
- \* Registries with ASCII fields are now limited to uppercase letters; fields starting with 0x2D, the ASCII minus sign, are reserved for Private or Experimental Use..
- \* The policy for every registry is now Specification Required, as defined in [\[RFC8126\]](#), [Section 4.6](#).

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.

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## [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.

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	<a href="#">RFC 8915</a> , <a href="#">Section 5.3</a>
0x0200	No-Operation Request	<a href="#">RFC 5906</a>
0x0201	Association Message Request	<a href="#">RFC 5906</a>
0x0202	Certificate Message Request	<a href="#">RFC 5906</a>
0x0203	Cookie Message Request	<a href="#">RFC 5906</a>
0x0204	NTS Cookie	<a href="#">RFC 8915</a> , <a href="#">Section 5.4</a>
0x0204	Autokey Message Request	<a href="#">RFC 5906</a>
0x0205	Leapseconds Message Request	<a href="#">RFC 5906</a>
0x0206	Sign Message Request	<a href="#">RFC 5906</a>
0x0207	IFF Identity Message Request	<a href="#">RFC 5906</a>
0x0208	GQ Identity Message Request	<a href="#">RFC 5906</a>

0x0209	MV Identity Message Request	<a href="#">RFC 5906</a>
0x0302	Reserved for historic reasons	This RFC
0x0304	NTS Cookie Placeholder	<a href="#">RFC 8915</a> , <a href="#">Section 5.5</a>

0x0402	Reserved for historic reasons	This RFC	
+-----+	+-----+	+-----+	+-----+
0x0404	NTS Authenticator and	<a href="#">RFC 8915</a> ,	
	Encrypted Extension Fields	<a href="#">Section 5.6</a>	
+-----+	+-----+	+-----+	+-----+
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	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0x8201	Association Message Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0x8202	Certificate Message Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0x8203	Cookie Message Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0x8204	Autokey Message Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0x8205	Leapseconds Message Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0x8206	Sign Message Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0x8207	IFF Identity Message Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0x8208	GQ Identity Message Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0x8209	MV Identity Message Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
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	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0xC201	Association Message Error   Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0xC202	Certificate Message Error   Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0xC203	Cookie Message Error Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0xC204	Autokey Message Error   Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0xC205	Leapseconds Message Error   Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0xC206	Sign Message Error Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0xC207	IFF Identity Message Error   Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0xC208	GQ Identity Message Error   Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
0xC209	MV Identity Message Error   Response	<a href="#">RFC 5906</a>	
+-----+	+-----+	+-----+	+-----+
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

## 5. Acknowledgements

The members of the NTP Working Group helped a great deal. Notable contributors include.

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

## 6. Normative References

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## Author's Address

Rich Salz  
Akamai Technologies

Email: [rsalz@akamai.com](mailto:rsalz@akamai.com)

