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Time Configuration Options for DHCPv6
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Status of this Memo

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Abstract

This document describes the options for Time related configuration information in DHCPv6: NTP Servers and Timezone specifier.

1. Introduction

This document describes the options for time related configuration information in DHCPv6 [1].

2. Requirements

The keywords MUST, MUST NOT, REQUIRED, SHALL, SHALL NOT, SHOULD, SHOULD NOT, RECOMMENDED, MAY, and OPTIONAL, when they appear in this document, are to be interpreted as described in RFC 2119 [4]

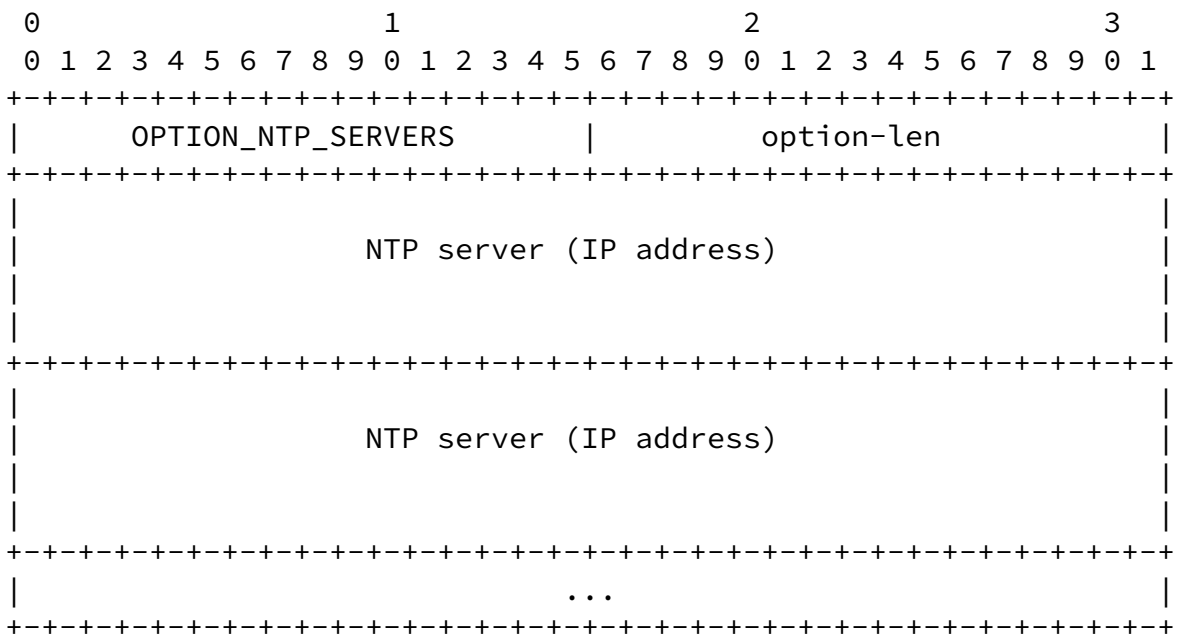
3. Terminology

This document uses terminology specific to IPv6 and DHCPv6 as defined in section "Terminology" of the DHCP specification.

4. Network Time Protocol (NTP) Servers option

The Network Time Protocol Servers option provides a list of one or more IP addresses of NTP [2] servers available to the client. The NTP servers SHOULD be listed in the order of preference.

The format of the Network Time Protocol Servers option is as shown below:



option-code: OPTION_NTP_SERVERS (tbd)

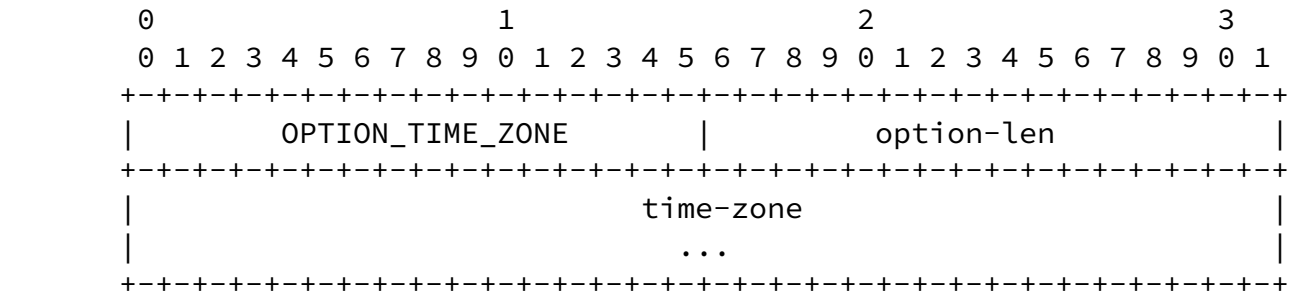
option-len: Length of the 'NTP server' fields in octets; It must be a multiple of 16

NTP server: IP address of NTP server

5. Timezone option

The Timezone option is used by the server to convey client's timezone information to the client.

The format of the Timezone option is:



option-code: OPTION_TIME_ZONE (tbd)

option-len: Length of the 'time-zone' field in octets

time-zone: Time zone of the client in the format as explained below.

Std[Offset[Dst[Offset],[Start[/Time],End[/Time]]]]

where '[' and ']' enclose optional fields, '|' indicates choice of exactly one of the alternatives, ',' and '/' represent literal characters present in the string.

If "Offset" is specified, then the time-zone is represented in the IEEE 1003.1 POSIX timezone format [3].

Std Three or more octets for the standard timezone (Std). Any character (or case) except a leading colon, digits, comma, minus or plus sign is allowed. If the time-zone is not represented in IEEE 1003.1 POSIX timezone format [3], then Std is treated as the index to the timezone database, for example, a file name, from where additional information about the timezone may be obtained.

Offset Indicates the value one must add to local time to arrive at UTC, of the form: [+|-]hh[:mm[:ss]]. Offset following Std is required, if the timezone is represented

in IEEE 1003.1 POSIX timezone format. Digits are always interpreted as decimal number. If preceded by a '-', the timezone is east of the Prime Meridian, otherwise it is west ('+' is optional) The permissible values for hh[:mm[:ss]] are as follows:

hh	0 <= hh <= 23
mm	0 <= mm <= 60
ss	0 <= ss <= 60

Dst Three or more octets for the daylight savings timezone. If Dst is missing, then daylight savings time does not apply in this locale. If no Offset follows Dst, then Dst is assumed to be one hour ahead of standard time. Any character (or case) except a leading colon, digits, comma, minus or plus sign is allowed.

Start Indicates the day of the year, in one of the formats indicated below, when to change to daylight savings time. The ``Time'' field (which follows immediately after a ``/'' character, if present) indicates when the change is made, in local time.

End Indicates the day of the year, in one of the formats indicated below, when to change back from daylight savings time. The ``Time'' field (which follows immediately after a ``/'' character, if present) indicates when the change is made, in local time.

Time Time has the same format as Offset, except that no leading ``-'' or ``+'' is permitted. The default is 02:00:00.

The day of the year needs to be given in any of the following formats:

Jn The julian day n, (1 <= n <= 365). Leap days are not counted.

n Zero-based julian day, (0 <= n <= 365). Leap days are counted so it is possible to refer to Feb 29.

Mm.n.d The ``d''th day, (0 <= d <= 6) of week ``n'' of month ``m'' of the year (1 <= n <= 5, 1 <= m <= 12, where week 5 means last ``d'' day in month ``m'' which may occur in either the fourth or the fifth week. Week ``1'' is the first week in which the ``d'' day occurs. Day ``0'' refers Sunday, day ``1'' refers Monday and so on.

Examples:

i) Indian Standard Time zone is represented as:

IST-5:30

Here, ``IST'' refers the standard timezone and ``-5:30'' is the offset. `-' sign in the offset says that the timezone is 5 hours and 30 minutes ahead of UTC. Absence of ``Dst'' says that daylight savings doesn't apply to this locale.

ii) For Eastern USA time zone, 1986, the timezone string is as shown below:

EST5EDT4,116/02:00:00,298/02:00:00

It says:

The standard time zone is in 5 hours behind UTC. The Daylight Savings Timezone is 4 hours behind UTC. Day light savings starts at 116 day, i.e., April 27 02:00 AM standard time and ends at 298th day, i.e., October 26 02:00 AM daylight time.

It can also represented as:

EST5EDT,116/02:00:00,298/02:00:00

Since no offset follows the ``Dst'', daylight savings time is 1 hour ahead of standard time, thus, it is 4 hours behind UTC.

iii) Representing ii) in the non POSIX standard way is:

America/New-York

It says that the locale belongs to New-York timezone in America, which will be used as the index in to a timezone database to get more information of the timezone.

6. Appearance of these option

The NTP servers and Timezone options MUST appear only in the following messages: Solicit, Advertise, Request, Confirm, Renew, Rebind, Information-Request and Reply.

The option number for these options MAY appear in the Option Request Option [1] in the following messages: Solicit, Request, Confirm, Renew, Rebind, Information-Request and Reconfigure.

7. Security Considerations

The NTP servers option may be used by an intruder DHCP server to cause DHCP clients to contact an intruder NTP server, resulting in invalid synchronization of time in client and finally leading to time critical applications running inaccurately in client machine. The time accuracy can be crucial to some security algorithms. For example, it may cause expired certificates to gain a new life, making the application less secured.

The Timezone option may be used by an intruder DHCP server to assign invalid time zones, leading to timing issues for the applications running on the client machine.

To avoid attacks through these options, the DHCP client SHOULD use authenticated DHCP (see section "Authentication of DHCP messages" in the DHCPv6 specification [1]).

8. IANA Considerations

IANA is requested to assign an option code to these options from the option-code space defined in section "DHCPv6 Options" of the DHCPv6 specification [1].

9. Normative References

[1] Bound, J., Carney, M., Perkins, C., Lemon, T., Volz, B. and R. Droms (ed.), "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)", draft-ietf-dhc-dhcpv6-28 (work in progress), November

2002.

10. Informative References

[2] D. Mills. Simple Network Time Protocol (SNTP) Version 4 for IPv4, IPv6 and OSI. Request for Comments (Informational) 2030, Internet Engineering Task Force, October 1996.

[3] IEEE, "1003.1 POSIX Timezone Specification", 1988.

[4] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

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