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         Distributing Default Address Selection Policy using DHCPv6
                 draft-fujisaki-dhc-addr-select-opt-01.txt

Status of this Memo

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Abstract

   This document describes a new DHCPv6 option for distributing default
   address selection policy information to a client. With this option,
   site administrators can distribute address selection policy to
   control the node's address selection behavior.

1. **Introduction**

   RFC3484 [RFC3484] describes algorithms for selecting a default
   address when a node has multiple destination and/or source addresses
   by using an address selection policy. Administrators can control the
   node's default address selection behavior by distributing the policy.
   Practical usages are described in [A. Matsumoto]. This document
   describes an option for distributing default address selection policy
   information using DHCPv6.

2. **Terminology**

   This document uses the terminology defined in [RFC2460] and the DHCP
   specification defined in [RFC3315]

3. **Default Address Selection Policy Option**

   The Default Address Selection Policy Option provides policy
   information for address selection rules. Specifically, it transmits
   a set of IPv6 source and destination address prefixes and some
   parameters that are used to control address selection as described in
   RFC 3484.

   Each end node is expected to configure its policy table, as described
   in RFC 3484, in a manner consistent with the Default Address
   Selection Policy option information.

   The format of the Default Address Selection Policy option is given
   below:


```
    0                   1                   2                   3
    0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |          OPTION_DASP           |          option-len           |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |    label     |   precedence   |  zone-index   |   prefix-len  |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
   |                                                               |
   |                  Prefix   (Variable Length)                   |
   |                                                               |
   |                                                               |
   +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

```
       |    label    |  precedence  |  zone-index  |   prefix-len  |
      +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
      |                                                             |
      |                    Prefix    (Variable Length)              |
      |                                                             |
      |                                                             |
      +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
      .                                                             .
      .                                                             .
      .                                                             .
      +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
      |    label    |  precedence  |  zone-index  |   prefix-len  |
      +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
      |                                                             |
      |                    Prefix    (Variable Length)              |
      |                                                             |
      |                                                             |
      +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
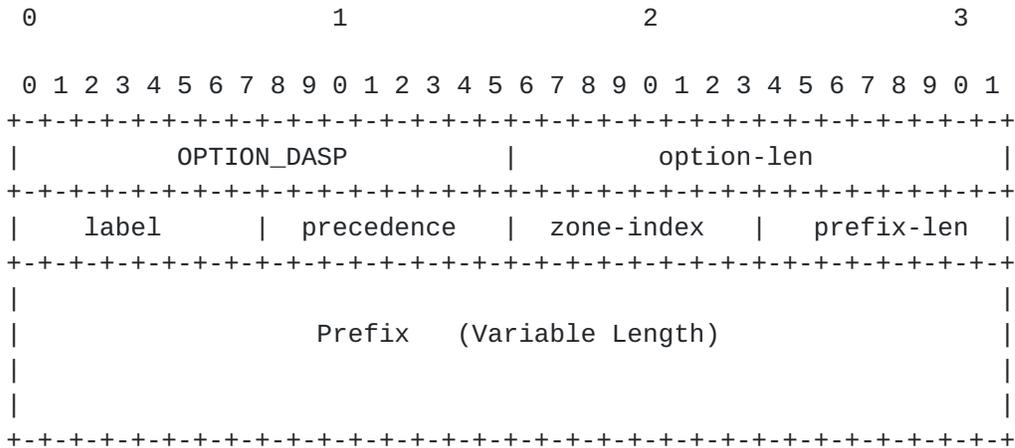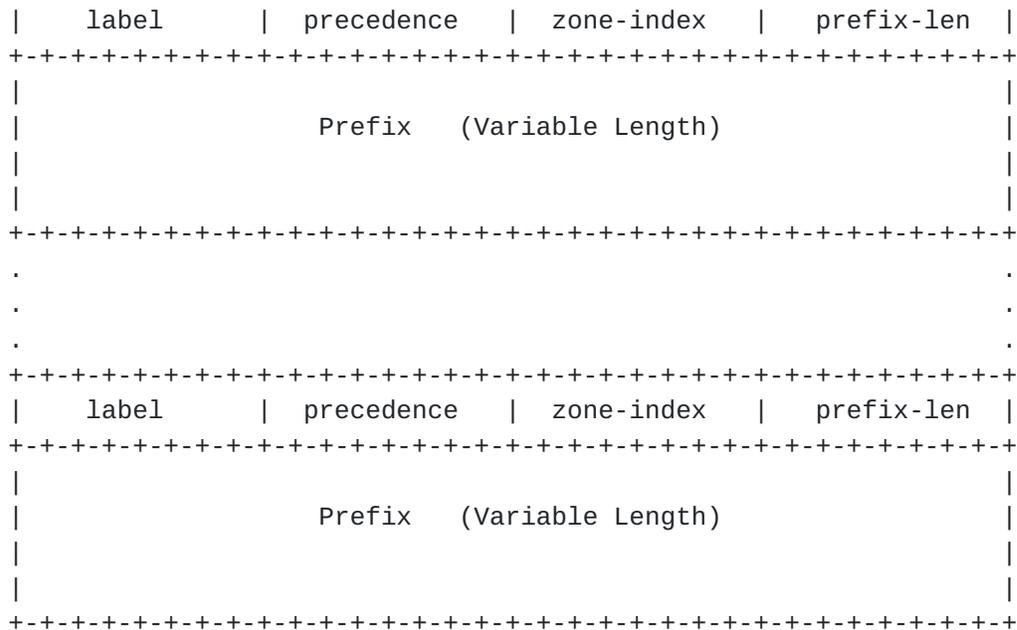
                              [Fig. 1]

   Fields:

   option-code: OPTION_DASP (TBD)

   option-len: The total length of the label fields, precedence fields,
        zone-index fields, prefix-len fields, and prefix fields in
        octets.

   label: An 8-bit unsigned integer; this value is used to make a
        combination of source address prefixes and destination address
        prefixes.

   precedence: An 8-bit unsigned integer; this value is used for sorting
        destination addresses.

   zone-index: An 8-bit unsigned integer; this value is used to specify
        zones for scoped addresses.

   prefix-len: An 8-bit unsigned integer; the number of leading bits in
        the prefix that are valid. The value ranges from 0 to 128. The
        Prefix field is 0, 4, 8, 12, or 16 octets, depending on the
        length.

   Prefix: A variable-length field containing an IP address or the

prefix of an IP address. IPv4-mapped address [mapped] must be
used to represent an IPv4 address as a prefix value.

4. **Appearance of this Option**

The Default Address Selection Policy option MUST NOT appear in any
messages other than the following ones : Solicit, Advertise, Request,
Renew, Rebind, Information-Request, and Reply.

5. **Implementation Considerations**

o The value 'label' is passed as an unsigned integer, but there is
   no special meaning for the value, that is whether it is a large or
   small number. It is used to select a preferred source address
   prefix corresponding to a destination address prefix by matching
   the same label value within this DHCP message. DHCPv6 clients
   need to convert this label to a representation specified by each
   implementation (e.g., string).

o Currently, the value label, precedence, and zone indices are
   defined as 8-bit unsigned integers. In almost all cases, this
   value will be enough.

o The 'precedence' is used to sort destination addresses. There
   might be some cases where precedence values will conflict when a
   client already has a selection policy configured or a client
   receives multiple policies from multiple DHCP servers (e.g., when
   a home gateway in a user network is connected to multiple upstream
   ISPs). In such cases, manual configuration of the policy will be
   necessary.

6. **Discussion**

o The 'zone index' value is used to specify a particular zone for
   scoped addresses. This can be used effectively to control address
   selection in the site scope (e.g., to tell a node to use a
   specified source address corresponding to a site-scoped multicast
   address). However, in some cases such as a link-local scope
   address, the value specifying one zone is only meaningful locally
   within that node. There might be some cases where the
   administrator knows which clients are on the network and wants
   specific interfaces to be used though. However, it is hard to use
   this value in general case.

7. **Security Considerations**

   A rogue DHCPv6 server could issue bogus default address selection
   policies to a client. This might lead to incorrect address selection
   by the client, and the affected packets might be blocked at an
   outgoing ISP because of ingress filtering.

   To guard against such attacks, both DCHP clients and servers SHOULD
   use DHCP authentication, as described in section 21 of RFC 3315,
   "Authentication of DHCP messages."

8. **References**

   [A. Matsumoto]
               Matsumoto, A., Fujisaki, T., and J. Kato, "Practical
               Usages of Default Address Selection Policy Distribution",
               draft-arifumi-ipv6-policy-dist-00.txt-00.txt. (Work In
               Progress) (work in progress), Dec 1 2005.

   [RFC2460]   Deering, S. and R. Hinden, "Internet Protocol, Version 6
               (IPv6) Specification", RFC 2460, December 1998.

   [RFC3315]   Droms, R., Bound, J., Volz, B., Lemon, T., Perkins, C.,
               and M. Carney, "Dynamic Host Configuration Protocol for
               IPv6 (DHCPv6)", RFC 3315, July 2003.

   [RFC3484]   Draves, R., "Default Address Selection for Internet
               Protocol version 6 (IPv6)", RFC 3484, February 2003.

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