

IPv6 Neighbor Discovery Overlay Multilink Network Interface (OMNI) Option

IETF 6MAN Working Group

November 17, 2020

Fred L. Templin (fred.l.templin@boeing.com)

The Boeing Company

OMNI Option Background

- **draft-templin-6man-omni-option**
- **new IPv6 ND option type (IANA assignment requested)**
- **option body contains TLV-format sub-options (initial set defined)**
- **option may occur in any IPv6 ND message type (RS/RA/NS/NA)**
- **nodes that recognize the option apply OMNI conventions**
- **nodes that do not recognize the option simply ignore it**
 - **IANA-assigned value allows immediate option recognition in a single-octet compare (determines whether peer understands OMNI w/o having to look more deeply into the option)**

OMNI Option Format

An Overlay Multilink Network Interface (OMNI) IPv6 ND option is defined. The option (known as the "OMNI option") is formatted as shown in Figure 1:

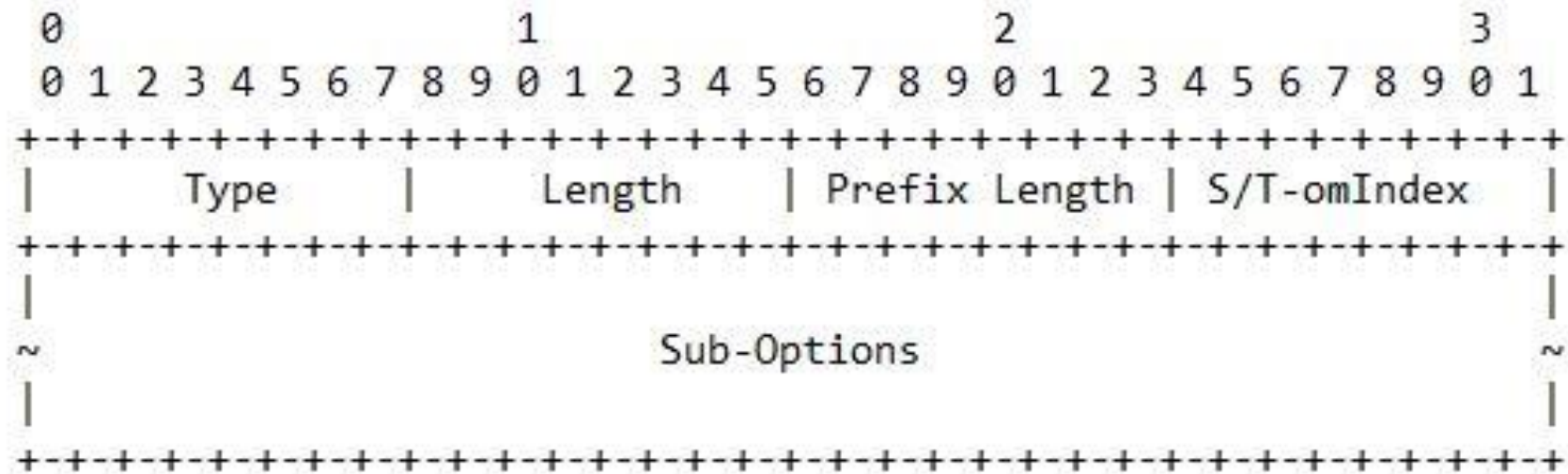



Figure 1: OMNI Option Format

OMNI Option Header Fields

In this format:

- o Type is set to TBD.  IANA value requested
- o Length is set to the number of 8 octet blocks in the option.
- o Prefix Length is a 1-octet field that encodes a value between 0 and 128 as a prefix length for the IPv6 source or destination address of the IPv6 ND message. Prefix Length is set to the length of the prefix for addresses that include a global or unique-local prefix; for other address types, it is set to the value 128.
- o S/T-omIndex is a 1-octet field that encodes a value between 0 and 255 identifying the source or target underlying interface for the IPv6 ND message. For RS and NS messages S/T-omIndex refers to the "Source" underlying interface over which the message is sent, while for RA and NA messages S/T-omIndex refers to the "Target" underlying interface that will receive the message.
- o Sub-Options is a Variable-length field, of length such that the complete OMNI Option is an integer multiple of 8 octets long. Contains one or more Sub-Options, as described in Section 3.1.

OMNI Option Processing Rules

The OMNI option may appear in any IPv6 ND message type; it is processed by interfaces that recognize the option and ignored by all other interfaces. If a single IPv6 ND message contains multiple OMNI options, the first option is processed and any additional options are ignored.

An OMNI option may include full or partial information for the neighbor. If an OMNI option with full information is received, its contents provide new information and/or update any previously cached information. If an OMNI option with partial information is received, its contents provide new information and/or update only the corresponding previously cached information. The union of the information in the most recently received OMNI options is therefore retained, and the information is aged/removed in conjunction with the corresponding neighbor cache entry.

OMNI Sub-Option Format

The OMNI option includes zero or more Sub-Options. Each consecutive Sub-Option is concatenated immediately after its predecessor. All Sub-Options except Pad1 (see below) are in type-length-value (TLV) encoded in the following format:

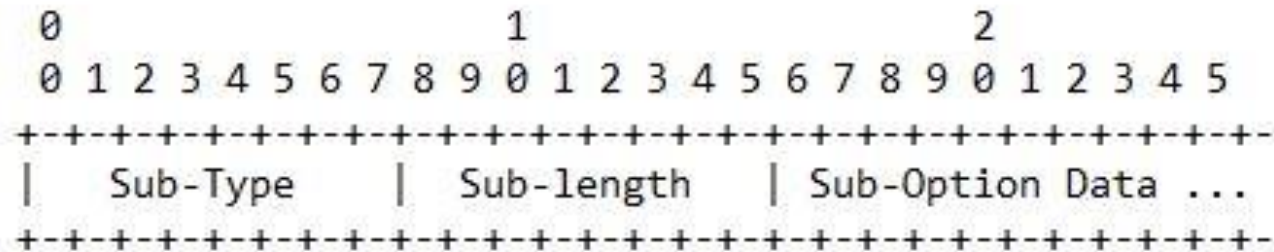


Figure 2: Sub-Option Format

- o Sub-Type is a 1-octet field that encodes the Sub-Option type. Sub-Options defined in this document are:
- o Sub-Length is a 1-octet field that encodes the length of the Sub-Option Data (i.e., ranging from 0 to 255 octets).
- o Sub-Option Data is a block of data with format determined by Sub-Type.

OMNI Sub-Options

- Sub-options defined in this document:
 - 0 - Pad1 (one octet of zero padding)
 - 1 - PadN (N octets of zero padding)
 - 2 - Interface Attributes (Type 1)
 - 3 – 252 – Available for assignment
 - 253-254 – Reserved for experimentation
 - 255 – Reserved by IANA
- Other documents may define new sub-options

OMNI Interface Attributes (Type 1)

Interface Attributes (Type 1)

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																																																					
Sub-Type=2										Sub-length=N										omIndex										omType																																																						
Provider ID										Link					Resvd					P00	P01	P02	P03	P04	P05	P06	P07																																																									
P08										P09					P10					P11					P12					P13					P14					P15					P16					P17					P18					P19					P20					P21					P22					P23				
P24										P25					P26					P27					P28					P29					P30					P31					P32					P33					P34					P35					P36					P37					P38					P39				
P40										P41					P42					P43					P44					P45					P46					P47					P48					P49					P50					P51					P52					P53					P54					P55				
P56										P57					P58					P59					P60					P61					P62					P63																																												

OMNI Interface Attributes (Type 1)

- o Sub-Type is set to 2. If multiple instances with different omIndex values appear in the same OMNI option all are processed; if multiple instances with the same omIndex value appear, the first is processed and all others are ignored
- o Sub-Length is set to N (from 1 to 255) that encodes the number of Sub-Option Data octets that follow.
- o omIndex is a 1-octet field containing a value from 0 to 255 identifying the underlying interface for which the interface attributes apply.
- o omType is a 1-octet field containing a value from 0 to 255 corresponding to the underlying interface identified by omIndex.

OMNI Interface Attributes (Type 1)

- o Provider ID is a 1-octet field containing a value from 0 to 255 corresponding to the underlying interface identified by omIndex.
- o Link encodes a 4-bit link metric. The value '0' means the link is DOWN, and the remaining values mean the link is UP with metric ranging from '1' ("lowest") to '15' ("highest").
- o Resvd is reserved for future use.
- o A 16-octet ""Preferences" field immediately follows 'Resvd', with values P[00] through P[63] corresponding to the 64 Differentiated Service Code Point (DSCP) values [RFC2474]. Each 2-bit P[*] field is set to the value '0' ("disabled"), '1' ("low"), '2' ("medium") or '3' ("high") to indicate a QoS preference for underlying interface selection purposes.

Sub-Options Defined in Other Documents

- Interface Attributes (Type 2)
- Traffic Selector
- Mobility Service Register
- Mobility Service Release
- Network Access Identifier
- Geographical Coordinates
- DHCP Unique Identifier (DUID)

IANA Considerations

The IANA is instructed to allocate a Type number TBD from the registry "IPv6 Neighbor Discovery Option Formats" for the OMNI option (see: Section 13 of [RFC4861]) as a provisional registration in accordance with Section 4.13 of [RFC8126].

The OMNI option also defines an 8-bit Sub-Type field, for which IANA is instructed to create and maintain a new registry entitled "OMNI option Sub-Type values". Initial values for the OMNI option Sub-Type values registry are given below; future assignments are to be made through Expert Review [RFC8126].

Working Group Action Request

- Adopt as 6man WG Item?

Backups