SD-WAN UNI IPv6 Connection Addressing Service Attribute

The SD-WAN UNI IPv6 Connection Addressing specifies how IPv6 addresses are allocated to the devices connected to the UNI. It is one of the five values *None*, *DHCP*, *SLAAC*, *Static* or *LL-only*, plus in the case of *DHCP*, *SLAAC* or *Static*, some additional parameters. If the IPv6 Connection Addressing is None, no IPv6 addresses are used by the devices connected to the UNI and IPv6 is disabled on the link. Note that in this case IPv4 connection addresses are needed (see [R61]).

If the value of the SD-WAN UNI IPv6 Connection Addressing Service Attribute is one of *DHCP*, *Static*, *SLAAC*, *LL-only*, then IPv6 Link-Local addresses are present on the UNI. If the value is LL-only, then only IPv6 Link-Local addressing is used on the UNI.

If the value of the SD-WAN UNI IPv6 Connection Addressing is DHCP, then DHCPv6 is used by the Subscriber devices to request IPv6 addresses in a given subnet from the Service Provider as described in RFC 3315 [12]. The Service Provider hosts the DHCP server and the Subscriber devices act as the DHCP clients.

> **[R66]** When the value of the SD-WAN UNI IPv6 Connection Addressing Service Attribute is DHCP, the Service Provider **MUST** use DHCP to convey to the Subscriber, in addition to the IPv6 address, the subnet mask and router address.

If the value of the SD-WAN UNI IPv6 Connection Addressing is Static, then IPv6 addresses in a given IPv6 subnet are statically assigned to the Service Provider and the Subscriber.

If the value of the SD-WAN UNI IPv6 Connection Addressing is SLAAC, then Stateless Address Auto configuration (SLAAC) is used by the Subscriber devices to create unique IPv6 global addresses within an IP Prefix advertised by the Service Provider as described in RFC 4862 [14]. The Router Advertisements that convey the IP Prefix is also be used to convey the prefix length and router address.

For DHCP, SLAAC and Static, a number of further parameters have to be agreed:

- Subnet List of one or more subnets, each comprising:
  - IPv6 Prefix
    - IPv6 address prefix and prefix length between 0 and 128 for DHCP and Static, or
    - IPv6 address prefix and prefix length of 64 for SLAAC
  - Service Provider IPv6 Addresses (Non-empty list of IPv6 addresses)

The parameters consist of a list of one or more subnets. For each subnet, the IPv6 prefix and the SP's IPv6 address are specified. The IPv6 Prefix is referred to as the Connection IPv6 Prefix. Note that an IP Prefix and Service Provider addresses need to be agreed even when DHCP or SLAAC is used, so that the Sub-scriber can ensure they do not conflict with any other addressing used within the Subscriber Network.

A list (possibly empty) of reserved IP Prefixes can be specified (section 8.4); these specify IP addresses that are not available for the Subscriber to assign statically.
If DHCP is used, the IPv6 address range, from which Subscriber addresses are dynamically assigned, is taken from the prefixes listed in the value of the SWVC Reserved Prefixes Service Attribute that are subnets of any Connection IPv6 Prefix.

> **[R67]** If the value of the SD-WAN UNI IPv6 Connection Addressing is Static, DHCP or SLAAC, for each entry in the Subnet List, the Service Provider IPv6 Addresses **MUST** be within the Connection IPv6 Prefix for that entry.

> **[R68]** If the value of the SD-WAN UNI IPv6 Connection Addressing is DHCP, addresses that are dynamically assigned by DHCP **MUST** be taken from within one of the IP Prefixes in value of the SWVC Reserved Prefixes (section 8.4) that is a subnet of one of the Connection IPv6 Prefixes.

> **[R69]** If the value of the SD-WAN UNI IPv6 Connection Addressing is SLAAC, the IP Prefix advertised by the Service Provider as described in RFC 4862 [14] using Router Advertisements **MUST** be the Connection IPv6 Prefix for the first entry in the Subnet List.

The Subscriber can statically assign any IPv6 address within the subnets identified by the Connection IPv6 Prefix in each entry, other than the Service Provider address itself, the lowest and highest possible ad-dresses, which are generally reserved, and any address within IP Prefixes listed in the value of the SWVC Reserved Prefixes Service Attribute (see section 8.4).

> **[R70]** If the value of the SD-WAN UNI IPv6 Connection Addressing is DHCP, SLAAC or Static, the Subscriber **MUST NOT** statically assign any of the following for use on the UNI by Subscriber devices:

Any IPv6 address that is not within the Connection IPv6 Prefix for an entry in the Subnet List.
Any IPv6 address within the Connection IPv6 Prefix for the first entry in the Subnet List, if the SD-WAN UNI IPv6 Connection Addressing is SLAAC.
Any of the Service Provider IPv6 Addresses specified in an entry in the Subnet List.
The lowest and highest IPv6 addresses in the Connection IPv6 Prefix for an entry in the Subnet List, if the prefix length is less than or equal to 126.
Any IPv6 address within IP Prefixes listed in the value of the SWVC Reserved Prefixes Service Attribute (see section 8.4).

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