

Dynamic Host Configuration Protocol (DHCPv6) Options for Shared IP Addresses Solutions

draft-boucadair-dhcpv6-shared-address-option (12/2009)
Softwire WG Interim Meeting-BEIJING, September 2011

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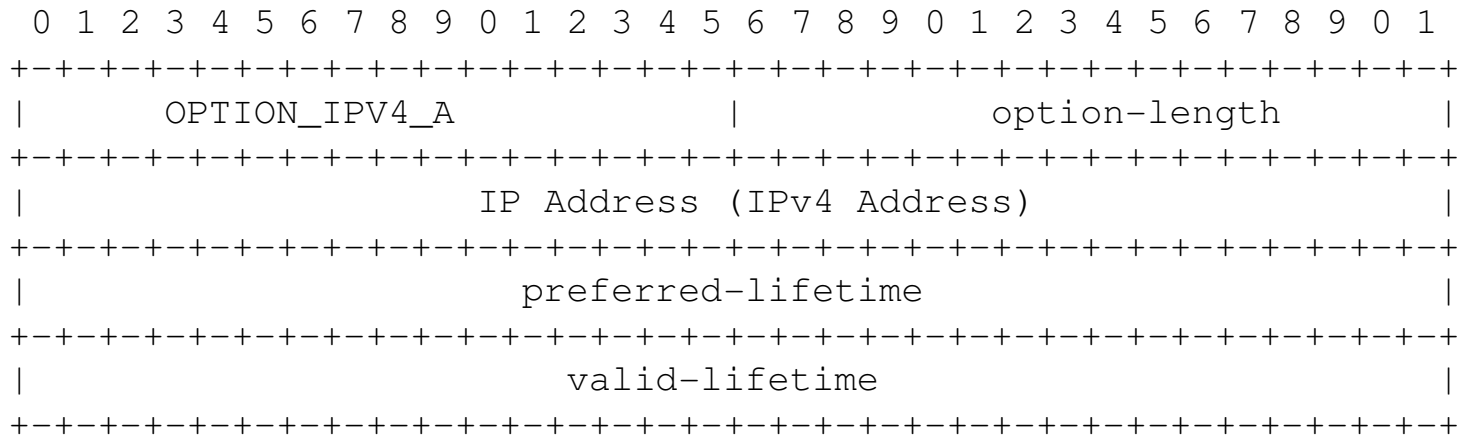
Overall Context

- In some deployment scenarios, **IPv4 DHCP can not be used** to configure customer devices because only IPv6 capabilities are deployed (e.g., DS-Lite (RFC6333) or A+P (RFC6346)) ...
- ...but some of these scenarios **require the provisioning of IPv4-related** information
- **DHCPv6 may be used to convey IPv4-related** configuration information, e.g.-
 - Plain IPv4 address
 - Port Extended IPv4 addresses
 - Port Sets
- **For stateless solutions, the provisioning of IPv6 prefix to build IPv4-converted IPv6 addresses is also required**
 - Both Unicast and Multicast PREFIX64s may be conveyed

New Proposed Options

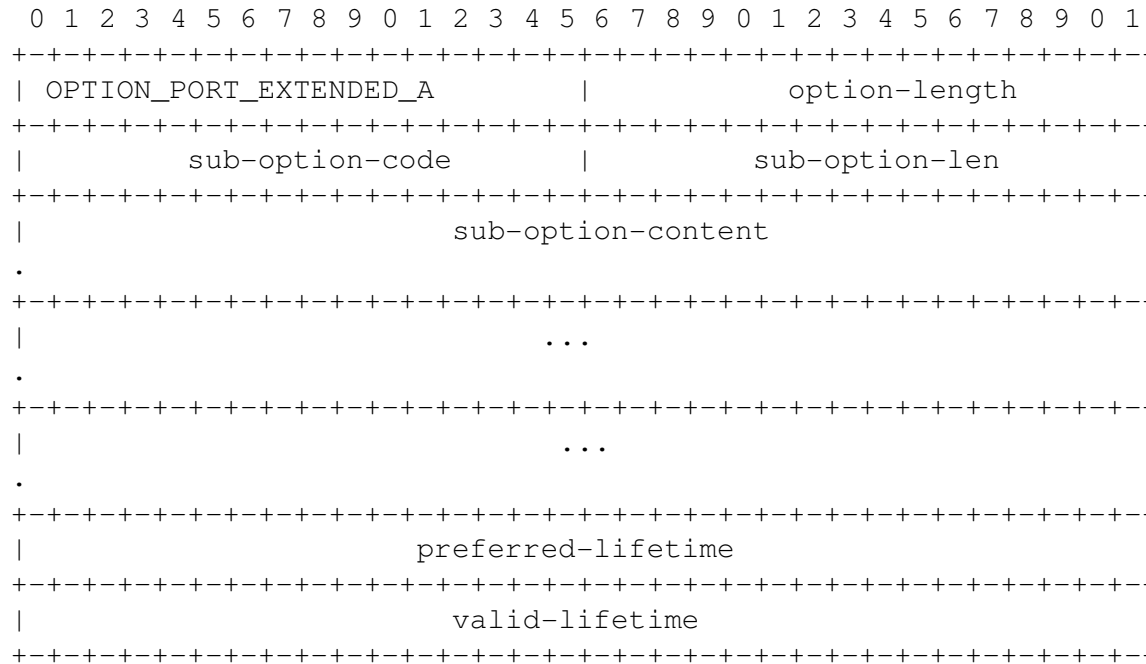
- **IPv4 Address**
 - This option is used to convey a "full" IPv4 address
- **Port Extended IPv4 Address**
 - This option carries an IPv4 address to be used in conjunction with an allocated Port Set
 - This option defines the allowed port values to be used as source port number
 - This option is completely independent of the IPv4 Address Option
- **IPv4-Embedded IPv6 Address Format**
 - This option is used to provide the device with the PREFIX64 to be used to build an IPv4-converted IPv6 address
- **Supported IPv4-Embedded IPv6 Address Formats**
 - This option allows a DHCPv6 client to indicate the type of IPv4-embedded IPv6 address format(s) it can handle
 - Its covers also the multicast scenario
 - This option is valid only when several address format are standardized

IPv4 Address DHCPv6 Option



- Conveys a non-shared IPv4 address
- This option can be used in this scenario:
 - **draft-ietf-softwire-public-4over6**

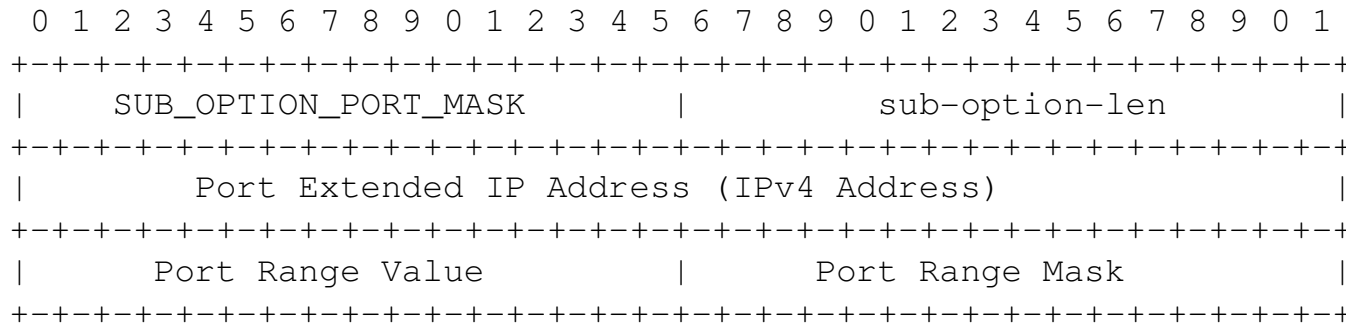
Port Extended IPv4 Address DHCPv6 Option



- **sub-option code**: specifies the code of the included sub-options. Two sub-codes are currently defined:
 - SUB_OPTION_PORT_MASK
 - SUB_OPTION_DELG_RAND
- This sub-option can be used in both stateless and binding modes
- For stateless mode, SUB_OPTION_PORT_MASK can be in
 - I-D.boucadair-behave-ipv6-portrange
 - I-D.despres-softwire-4rd-addmapping

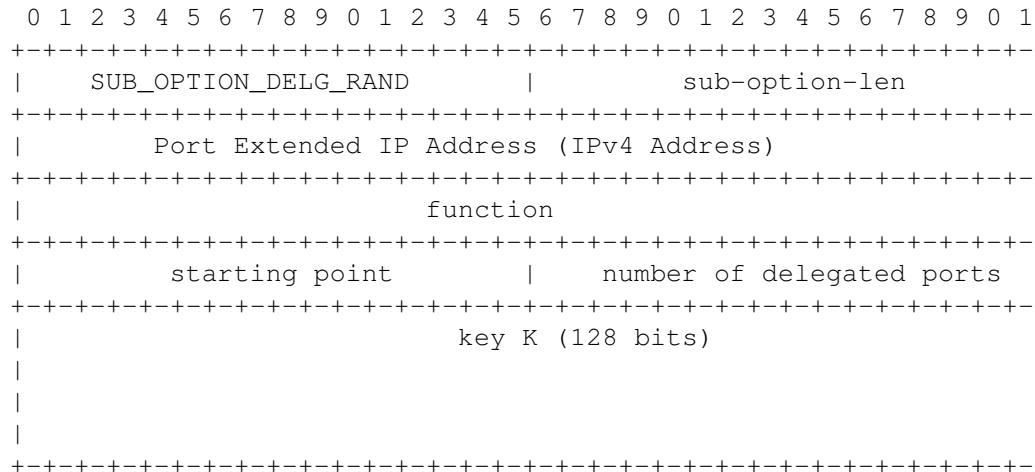
Port Extended IPv4 Address

DHCPv6 Option: SUB_OPTION_PORT_MASK



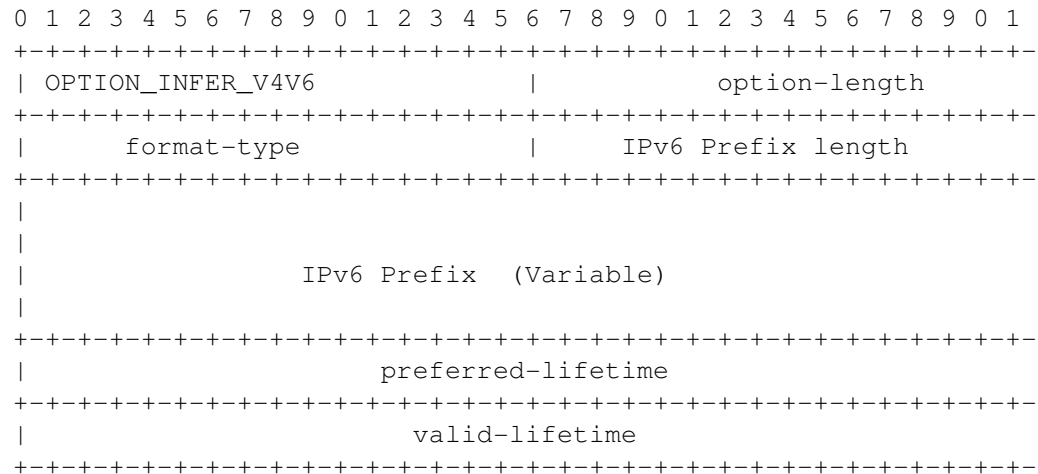
- The Port Range Value and Port Range Mask are used to specify a set of ports (contiguous or not contiguous) pertaining to a given IP address
 - **Port Extended IP Address:** specifies the shared IPv4 address
 - **Port Range Mask (PRM):** The Port Range Mask indicates, by the bit(s) set to 1, the position of the significant bits of the Port Range Value.
 - **Port Range Value (PRV):** PRV indicates the value of the significant bits of the Port Mask.
 - The significant bits may take a value of 0 or 1
 - All the other bits (a.k.a., non significant ones) are set to 0

Port Extended IPv4 Address DHCPv6 Option: SUB_OPTION_DELG_RAND



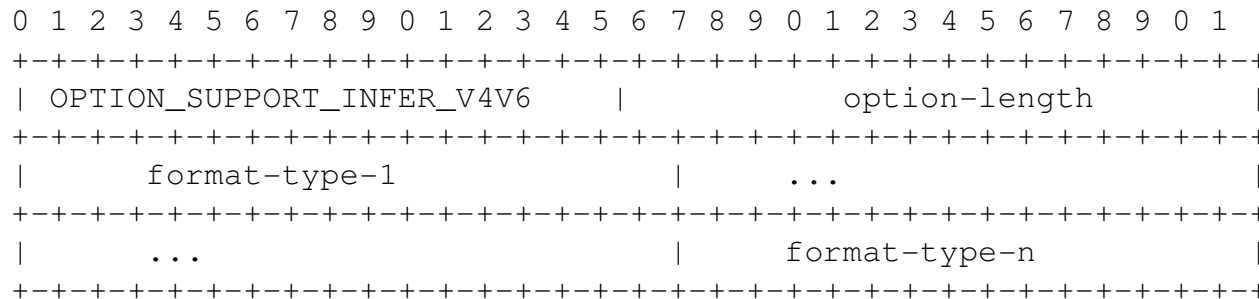
- This sub-option is used to delegate a random port set
- It is not compliant with stateless solutions
- Can be used in the binding mode (i.e., few per-customer state as defined in RFC6346)

IPv4-Embedded IPv6 Address Format Option



- **IPv6 Prefix:** Encloses the IPv6 prefix used to build IPv4-converted IPv6 addresses
- **format-type:** Indicates the format type of the IPv4-converted IPv6 address. Defined values are as follows:
 - “1”: /128. All IPv4 packets are encapsulated towards that IPv6 address (similar to DS-Lite encapsulation behavior)
 - “2”: The address format is compliant with RFC6052. IPv4 packets are sent to an IPv4-converted IPv6 address synthesized from the provided IPv6 Prefix and destination IPv4 address.
 - “3”: The address format to used to build IPv4-converted IPv6 address includes “destination port” (e.g., I-D.boucadair-behave-ipv6-portrange)

Supported IPv4-Embedded IPv6 Address Formats Option



- This option is important when DS-Lite, A+P, etc. customers are connected to the same network.
- Used as a hint by the server to tune the config
- A client may indicate the format-type values it can support by including the Supported IPv4-Converted IPv6 Address Formats Option in a DHCPv6 Solicit, Request, Renew, Rebind, Confirm or Information-request message
- The order in the list may indicate preference in format-types, the first value being the preferred one

Next Steps

- Add multicast considerations
- Contributions and comments are welcomed