

# Dynamic Allocation of Shared IPv4 Addresses using DHCPv4 over DHCPv6 *draft-farrer-dhc-shared-address-lease-00*

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# Motivation

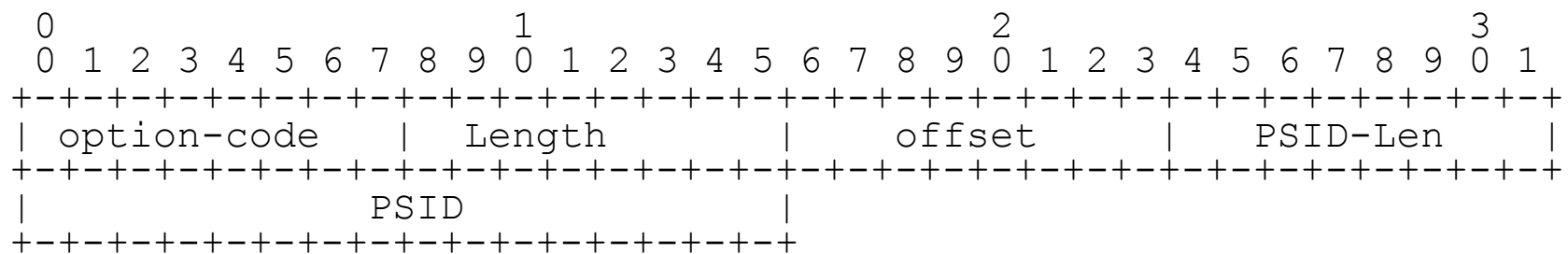
- Current DHCP based provisioning methods (DHCPv6 / DHCPv4 over XXXv6) have focused on a DHCP reservation method with static v6->v4+ports mapping (1:1 or algorithmic)
- This is wasteful – all possible customers need to have a partial IPv4 address permanently assigned
- Fixed address allocation models may place limitations upon the homenet topology e.g:
  - The tunnel will be sourced from a pre-configured prefix
  - Only a single tunnel may be created from a single homenet v6 allocation (e.g. /56)

# Dynamic, Shared IPv4 Address Leasing Advantages

- Only have to provide addresses for the peak number of ACTIVE users instead of all POSSIBLE users
  - Especially if combined with short leases and dynamic tunnel tear down
- Homenet topology restrictions are removed
  - The client can originate from any prefix - minimal pre-configuration is necessary as leasing parameters are dynamically learnt
- The trade-in is that the dynamic leasing info must be dynamically propagated out to other devices (e.g. Softwire concentrators)

# Functional Overview

- Uses the normal DHCPv4 dynamic allocation process, extended to include a unique restricted port range provisioned alongside the shared address
- The mechanism requires some changes to RFC2131 as multiple clients are simultaneously allocated the same IPv4 address
- This is done by including the restricted port range alongside the leased v4 address as a new DHCPv4 option
- Restricted port range is transported within `OPTION_PORTPARAMSV4` (uses the same format as `OPTION_MAP PSID` (draft-ietf-softwire-map-dhcp))



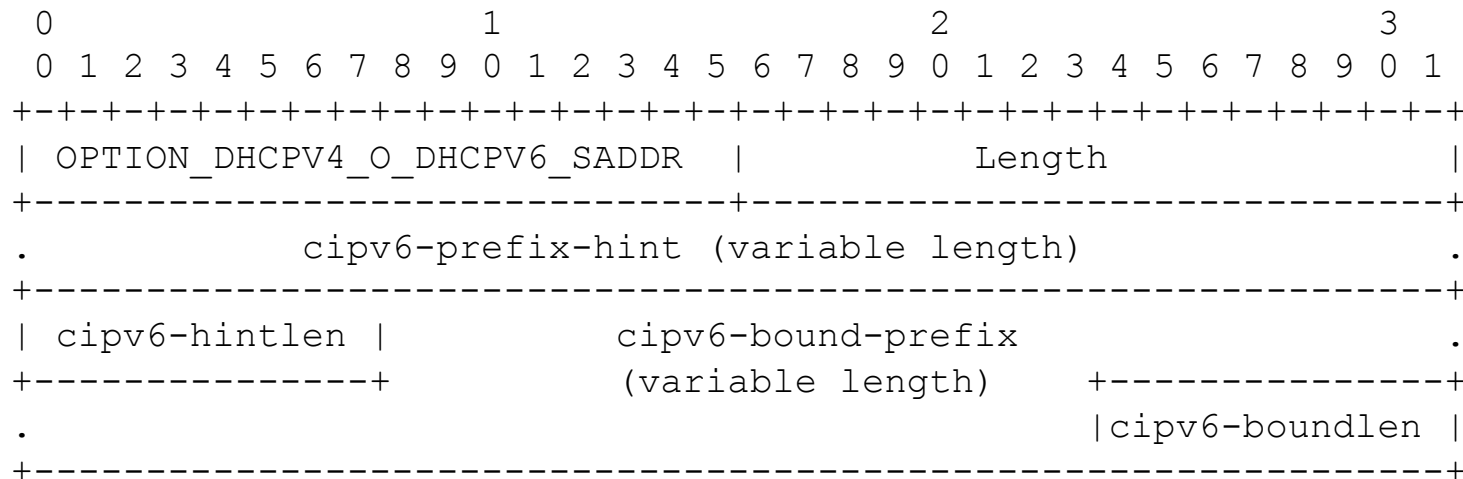
`OPTION_PORTPARAMSV4`

# Changes to RFC2131 Behaviour

- Existing RFC2131 DHCPv4 clients/servers are designed to prevent the allocation of the same address
  - Dynamic, shared addressing requires the same address to be allocated to several clients simultaneously
- The allocated port set and address become the tuple used to identify the lease. Both must be included in all relevant DHCP messages.
- The leased, shared v4 address must not be configured as an on-link address
- If the process fails, link local v4 addresses (RFC3927) must not be configured
- Probing for duplicate use of the address (as per RFC2131) must not be carried out

# Working With Softwires

- To successfully create the softwire, binding between the dynamic v4 address, port range and v6 softwire endpoint must be known
  - As the dynamic DHCPv4 server knows the v4 lease, it makes sense for it to have the v6 information as well
- A new DHCPv6 option is used for this with two parts:
  - A hint from server to DHCPv4 client on which prefix to use (to replicate 'MAP Rule IPv6 Prefix' function)
  - A binding from the client to the server with the actual prefix in use



# OPTION\_DHCPV4\_O\_DHCPV6\_SADDR

## Message Flow

	Cipv6-prefix-hint	Cipv6-hintlen	Cipv6-bound-prefix	Cipv6-boundlen
DHCPDISCOVER	blank	blank	blank	blank
DHCPOFFER	Preferred prefix	Preferred prefix length	Blank	blank
DHCPREQUEST	Preferred prefix	Preferred prefix length	Bound prefix	Bound prefix length
DHCPACK	Preferred prefix	Preferred prefix length	Bound prefix	Bound prefix length

# Current Status and Questions

- v00 published
- Should this be split into two drafts, or kept as one?
- Any other operators interested collaborating in the draft?
- Anyone willing to provide a review?