

Unified IPv4-in-IPv6 Software CPE

draft-ietf-softwire-unified-cpe-00

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Motivation

- From discussions at IETF85, there was an agreement to ‘unify’ the CPEs for the different IPv4 in IPv6 softwire tunnel approaches that exist or are being developed
 - DS-Lite ‘B4’ (Stateful mode)
 - Lightweight 4 over 6 ‘lwB4’ (Binding mode)
 - MAP-E ‘MAP-CE’ (Stateless mode)
- This is to ensure compatibility between the approaches and flexibility for operators
 - Gives the operator the ability to choose which functionality they want their CPEs to support
 - Allows 3rd party CPEs to work on an operators network
 - Prevents an operator being ‘locked in’ to a single solution due to the functionality of their deployed CPEs (if they deploy CPEs with multiple capabilities)
- The tunnel concentrators for each mode are still separated for each solution (non-unified☺)

Unified CPE Overview

- Describes logic for Softwire tunnel initiators (CPEs) to use the presence or absence of configuration parameters to determine which Softwire 'mode' to operate in
- Describes the different softwire modes by their functional characteristics and the parameters necessary to configure them
- **Specify** a unified behavior
 - A Generic bootstrapping logic
 - Identify the list of requirements
 - A configuration example based on DHCP options is included
 - This does not exclude other provisioning channels

Parameters Necessary for Config.

- The following parameters are necessary to configure each of the different functional modes:

DS-Lite	Remote IPv4 in IPv6 tunnel endpoint address
Lw4o6	Remote IPv4 in IPv6 tunnel endpoint address Public IPv4 Address Restricted port-set
MAP-E	Mapping rules MAP domain parameters *

* MAP uses these rules to calculate the same configuration parameters as lw4o6 uses + a Forward Mapping Rule

Parameters Necessary for Config.

- Because there is a lot of overlap in the configuration parameters necessary, we use their presence / absence so that the CPE can configure itself correctly

	Tunnel Endpoint	Binding rule (inc. Public IPv4 addr.)	Restricted port set	Forward Mapping Rule
DS-Lite	✓	X	X	X
Lw4o6	✓	✓	optional	X
MAP-E	optional	X	optional	✓

DHCP-Based Configuration Example

- Taking the above logic and applying it to a DHCP based configuration model ...
- Two DHCP options are necessary
 - Option 64, used for provisioning the softwire concentrator (DS-Lite AFTR, MAP-E BR, lw4o6 lwAFTR)
 - OPTION_MAP (draft-ietf-softwire-map-dhcp-v03) – Some changes would be necessary
- Through the use of these DHCP options
 - The client can use DHCP request ORO to indicate which softwire modes it is capable of supporting
 - The operator can supply the relevant options to the client to tell it which mode to mount

Proposed Change to OPTION_MAP

- Remove the DMR. This functionality will be provided by DHCP Option64 (OPTION_AFTR_NAME)
- Addition of a new sub-option OPTION_MAP_BIND for lw4o6 v4 address provisioning

PROPOSAL – As OPTION_MAP would be used as a more universal softwire configuration option, it should be renamed to reflect this (e.g. OPTION_SOFTWARE)

Alignment of Configuration

- Currently, there are two methods by which a binding mode could be configured
 - Using lw4o6
 - Using MAP-E 1:1
- This needs to be aligned to actually unify the solution: *A single way of configuring a mode*
- The underlying mechanism used to implement this function doesn't need to change

PROPOSAL – MAP1:1 function gets provisioned using the OPTION_MAP_BIND (but would interpret this as 'EA=0')

Next steps

- MAP & Iw4o6 drafts to be updated to align with the unified CPE model
- Develop OPTION_MAP as the 'softwire' configuration DHCP option