# Requirements for IPv6 Customer Edge Routers to support IPv4 Connectivity as a Service

## <draft-ietf-v6ops-transition-ipv4aas-04>

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# Goal

- Make sure operators (even small ones), have the right support from vendors to deploy IPv6-only access and still allow IPv4 inside the customer LANs.

- Support the vendors in having this documented.

- Separate document from RFC7084 "Basic Requirements for IPv6 Customer Edge Routers".
  - RFC7084 is the base for this one

# Main Changes since -00

- Ensure operator control over the different transition mechanisms.

- UPnP section.

- Improved text, clarifications and ID-Nits.

# Requirements (vs RFC7084)

- G-1:  The IPv6 Transition CE Router MUST comply with [RFC7608] (IPv6 Prefix Length Recommendation for Forwarding).

- L-1:  The IPv6 Transition CE Router MUST implement a DNS proxy as described in [RFC5625] (DNS Proxy Implementation Guidelines).

- This document no longer considers the need to support 6rd ([RFC5969]) and includes slightly different requirements for DS-LITE [RFC6333].

# Transition Requirements (1)

- TRANS-1:  The IPv6 Transition CE Router MUST support the DHCPv6 S46 priority options described in [RFC8026] (Unified IPv4-in-IPv6 Softwire Customer Premises Equipment (CPE): A DHCPv6-Based Prioritization Mechanism).

- TRANS-2:  The IPv6 Transition CE Router MUST have a GUI and/or CLI option to manually enable/disable each of the supported transition mechanisms.

- TRANS-3:  The IPv6 Transition CE Router MUST request the relevant configuration options for each supported transition mechanisms, which MUST remain disabled at this step.

# Transition Requirements (2)

- TRANS-4: The IPv6 Transition CE Router, following Section 1.4 of [RFC8026], MUST check for a valid match in OPTION_S46_PRIORITY, which allows enabling/disabling a transition mechanism.

- TRANS-5: In order to allow the service provider to disable all the transition mechanisms, the IPv6 Transition CE Router MUST NOT enable any transition mechanisms if no match is found between the priority list and the candidate list.

# Specific Requirements

- Specific requirements for each transition mechanism:
  - 464XLAT
  - DS-Lite
  - Lw4o6
  - MAP-E
  - MAP-T

# IANA Considerations

- IANA is requested, by means of this document, to update the "Option Codes permitted in the S46 Priority Option" registry available at https://www.iana.org/assignments/dhcpv6-parameters/dhcpv6-parameters.xhtml#option-codes-s46-priority-option, with the following entry.

```
+---------------+------------------------+-------------+
| Option Code |   S46 Mechanism     | Reference |
+---------------+------------------------+-------------+
|     113     |       464XLAT        |  [thisdoc]  |
+---------------+------------------------+-------------+
```

Table 1: DHCPv6 Option Code for 464XLAT

# Next steps

- Questions ?

- Inputs ?

- Ready for last call ?

# **Backup Slides**

# DS-Lite vs RFC7084

- DLW-1: The CE router MUST support configuration of DS-Lite via the DS-Lite DHCPv6 option [RFC6334]. The IPv6 CE router MAY use other mechanisms to configure DS-Lite parameters. Such mechanisms are outside the scope of this document.

- DLW-2: The IPv6 CE router MUST NOT perform IPv4 Network Address Translation (NAT) on IPv4 traffic encapsulated using DS-Lite.

- DLW-3: If the IPv6 CE router is configured with an IPv4 address on its WAN interface, then the IPv6 CE router SHOULD disable the DS-Lite Basic Bridging BroadBand (B4) element.

- DSLITE-1: Same as DLW-1.

- DSLITE-2: The IPv6 Transition CE Router SHOULD support IGD-PCP IWF [RFC6970] (UPnP Internet Gateway Device - Port Control Protocol Interworking Function).

- DSLITE-3: If PCP ([RFC6887]) is implemented, the IPv6 Transition CE Router SHOULD implement [RFC7291] (DHCP Options for the PCP). If PCP ([RFC6887]) is implemented and a PCP server is not configured, the IPv6 Transition CE Router MUST assume, by DEFAULT, that the AFTR is the PCP server. A plain IPv6 mode MUST be used to send PCP requests to the server.

- DSLITE-4: Same as DLW-2.

# 464XLAT (1)

- 464XLAT-1:  The IPv6 Transition CE Router MUST perform IPv4 Network Address Translation (NAT) on IPv4 traffic translated using the CLAT, unless a dedicated /64 prefix has been acquired, either using DHCPv6-PD [RFC3633] (IPv6 Prefix Options for DHCPv6) or by alternative means.

- 464XLAT-2:  The IPv6 Transition CE Router SHOULD support IGD-PCP IWF [RFC6970] (UPnP Internet Gateway Device - Port Control Protocol Interworking Function).

- 464XLAT-3:  If PCP ([RFC6887]) is implemented, the IPv6 Transition CE Router MUST also implement [RFC7291] (DHCP Options for the PCP). Following ([RFC6887]), if no PCP server is configured, the IPv6 Transition CE Router MAY verify if the default gateway, or the NAT64 is the PCP server.  A plain IPv6 mode MUST be used to send PCP requests to the server.

# 464XLAT (2)

- 464XLAT-4:  The IPv6 Transition CE Router MUST implement [RFC7050] (Discovery of the IPv6 Prefix Used for IPv6 Address Synthesis) in order to discover the PLAT-side translation IPv4 and IPv6 prefix(es)/suffix(es).

- 464XLAT-5:  If PCP is implemented, the IPv6 Transition CE Router MUST follow [RFC7225] (Discovering NAT64 IPv6 Prefixes Using the PCP), in order to learn the PLAT-side translation IPv4 and IPv6 prefix(es)/suffix(es) used by an upstream PCP-controlled NAT64 device.

- 464XLAT-6:  A DHCPv6 Option "OPTION_V6_PREFIX64" ([RFC8115]), with zeroed ASM_mPrefix64 and SSM_mPrefix64, MUST also be considered as a valid NAT64 prefix (uPrefix64).

# 464XLAT (3)

- 464XLAT-7: If a DHCPv6 Option "OPTION_V6_PREFIX64" ([RFC8115]), with zeroed ASM_mPrefix64 and SSM_mPrefix64 provides a NAT64 prefix, or one or more NAT64 prefixes are learnt by means of either [RFC7050] or [RFC7225], then 464XLAT MUST be included in the candidate list of possible S46 mechanism (Section 1.4.1 of [RFC8026]).