DHC working Group   O. Troan
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                        DHCPv4 over A+P softwires
                     draft-troan-dhc-dhcpv4osw-00

Abstract

   A node getting IPv4 access via an A+P mechanism might need other IPv4
   configuration information. This memo describes how DHCPv4 is
   supported, on IPv4 over IPv6 tunnels with shared IPv4 addresses.

Status of This Memo

   This Internet-Draft is submitted in full conformance with the
   provisions of BCP 78 and BCP 79.

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1. Introduction

   A router connected to a IPv6 only network might get IPv4 connectivity
   through an IPv4 over IPv6 tunnel. The router can be provisioned with
   a single IPv4 address, a shared IPv4 address or an IPv4 prefix. The
   tunnel provisioining mechanism may include provisioning of the IPv4
   address/prefix and optional port set, or the IPv4 address may be
   provisioned using DHCPv4 running over the tunnel. Even though the
   addresses are provisioned as part of tunnel setup, there might be
   other IPv4 configuration parameters that should be provisioned to the
   host.

   This memo describes how DHCPv4 can be supported over an IPv4 over
   IPv6 tunnel. The mechanism is named "DHCPv4 over softwire" as
   described here [I-D.ietf-dhc-v4configuration].

   MAP [I-D.ietf-softwire-map] is used as the example of the IPv4 over
   IPv6 tunnel mechanism in this memo, while the mechanism described
   here should equally apply to other IPv4 over IPv6 mechanisms.

   Issues with running DHCPv4 over a softwire:

   1. A DHCPv4 without an IPv4 address sends requests from the
       unspecified address (0.0.0.0) the the IPv4 broadcast address
       (255.255.255.255).

   2. DHCPv4 clients send packets with UDP port 67 to UDP port 68
       (server).

   3. DHCPv4 uses hardware addresses (read Ethernet MAC addresses) as
       the way to identify clients.

   In MAP all nodes have a point to point tunnel to the MAP Border Relay
   (BR). The MAP BR is responsible for connecting the MAP domain with
   the IPv4 Internet. Given that the MAP Customer Edge (CE) router has
   a point to point tunnel to the MAP BR, then that tunnel supports
   broadcast already.

   The MAP BR MUST either be a DHCPv4 relay or DHCPv4 server. If the
   MAP BR is operating as a relay, it must insert option 82, with the
   DHCPv4 clients source IPv6 address.

   The DHCPv4 client and server MUST support [RFC4361] and [RFC6842].
   The client identifier is used instead of a hardware identifier.

A MAP BR does not consider the unspecified IPv4 address as a shared
IPv4 address. Or more correctly all MAP CEs can use the unspecified
IPv4 address with the full port set. The MAP BR routes IPv4 packets
using the option 82, just like any other DHCPv4 relay.

A DHCPv4 client that has its IPv4 address provisioned using the
tunnel setup mechanism, MAY send DHCPINFORMs using it's IPv4 unicast
address. In the case that this address is port restricted, a UDP
port within the assigned range MUST be used instead of port 67.

A DHCPv4 client communicates directly with the DHCPv4 server after it
has acquired addresses. That requires that the DHCPv4 server
supports clients using a different UDP port than 68.

If DHCPv4 is to be used for also assigning a port range, a new DHCPv4
option is required.

The tunnel provisioning mechanism SHOULD indicate if DHCPv4 is
required on the link or not. For links without a provisioning
mechanism, e.g. a manually configured tunnel, DHCPv4 SHOULD always
be tried.

2. Architecture

```
                    IPv4 over IPv6
   o---------------o    tunnel        o-------------o    o-------o
   | DHCPv4 client |_____| MAP BR      |____| DHCPv4|
   | MAP CE        |----------------| DHCPv4 relay|    | server|
   o---------------o                 o-------------o    o-------o
```
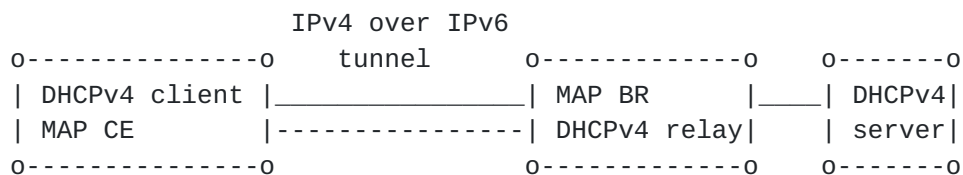
Figure 1: DHCP

3. Summary

This is a simple mechanism that requires a minimum of changes to
existing implementations and deployment practice. The mechanism
requires port aware DHCPv4 clients and servers. That is, that the
client can use a different UDP port than 68. There is already some
support for that in the ISC DHCP implementation. In addition the
DHCPv4 relay must be aware of the link-layer type, and insert a
correct option-82, just like it does today for VLANs.

4. IANA Considerations

This specification does not require any IANA actions.

5. Security Considerations

6. Acknowledgements

7. Normative References

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Author's Address

   Ole Troan
   Cisco Systems
   Philip Pedersens vei 1
   Lysaker 1366
   Norway

   Email: ot@cisco.com