DNS Server Selection on Multi-Homed Hosts

draft-savolainen-mif-dns-server-selection-03

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DNSOP WG meeting @ IETF#78

27-July-2010

Advanced multi-homed hosts

- Are connected and using multiple networks at the same time (over WLAN, cellular, VPN..)

- Some of the configured DNS servers may serve non-global information, e.g.

  - Private names for intranet use (e.g. VPN interface)

    - Special case is DNS server having **only** private information

  - DNS64 synthesized addresses which are only locally valid (e.g. cellular interface)

- Hosts should be able to do forward and reverse DNS queries efficiently

  (Note: Microsoft's Name Resolution Policy Table implements this kind of approach ₂
  (http://technet.microsoft.com/en-us/library/ee649207%28WS.10%29.aspx))

Broadband Forum liaison statement

- https://datatracker.ietf.org/liaison/922/ (2010-07-08)
- Quote:"Some IETF efforts that are of special interest to us include:
  - IPv6 multi-homed premises (where the CE router or host is connected to more than one IPv6 service provider); for example, as described in http://tools.ietf.org/html/draft-troan-multihoming-without-nat66-00. Individual technical issues are source address selection policy distribution, route information distribution, and DNS selection policy distribution.
- In BBF's case different services may be offered on shared IP-connection, e.g. Internet access and sensor networks utilizing private names
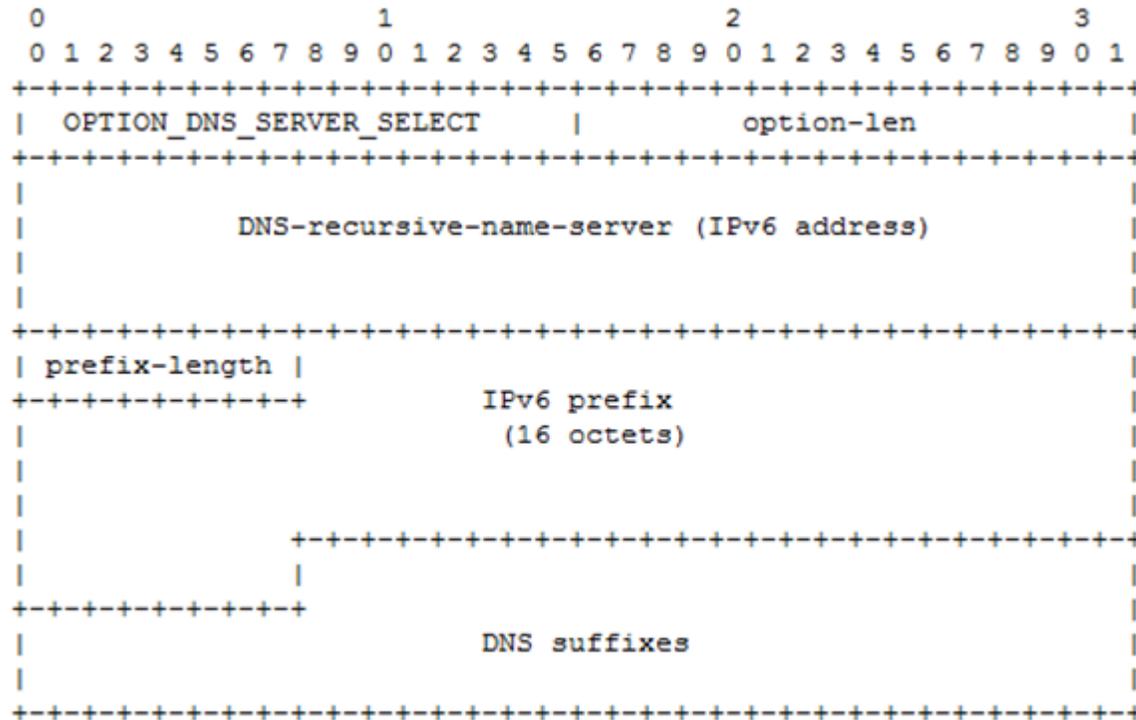
MIF WG work

- DNS resolution issues are already being described in MIF WG document (@IESG):
  - http://tools.ietf.org/html/draft-ietf-mif-problem-statement-04#page-7
  - Also in draft-cao-mif-analysis-01
- The proposed solution is being proposed as part of the MIF WG rechartering discussions (current draft):
  - Advanced DNS server selection solution: a specification for describing a way for a network to communicate to nodes **information required to perform advanced DNS server selection** needed for multi-homing and split-DNS scenarios. The specification shall describe the information to be delivered and the protocol for delivering.
  - Nov 2010: Initial WG draft on DNS server selection solution
  - Nov 2011: Submit DNS server selection solution to IESG for publication as a Proposed Standard RFC

The solution proposal in short

- A new DHCPv6 option to inform nodes (hosts or CPEs) about non-global information a DNS server knows about

- For each DNS query check if some DNS server is known to have special information (matching name suffix or address prefix)

  - E.g. for resolving "server.example.com" use the DNS server known to have non-global information about "example.com"

- *Note: one implementation alternative is to use indirect hints like information from Domain Search List Options (RFC3646) and from "more specific routes" (RFC4191)*

New DHCPv6 option for information delivery

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  OPTION_DNS_SERVER_SELECT      |           option-len          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                                                               |
|              DNS-recursive-name-server (IPv6 address)         |
|                                                               |
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| prefix-length |                                               |
+-+-+-+-+-+-+-+-+-+                 IPv6 prefix                  |
|                                   (16 octets)                 |
|                                                               |
|                 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+|
|                 |                                             |
+-+-+-+-+-+-+-+-+-+                                             |
|                    DNS suffixes                               |
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

A DNS server address with information it has particular knowledge about:

- DNS suffix(es) (namespace(s))
- IPv6 prefix for reverse lookups

To be added: two bits for preference (like in RFC4191):

01 High
00 Medium (default)
11 Low

- Maybe similar option for IPv4 would be needed
- Preference to be added for selecting the default DNS server
- Maybe suffix field should contain wildcard suffix (e.g. "*") to indicate capability to answer any queries

Request for DNSOP WG

- Confirm client behavior regarding this problem is out of scope for DNSOP WG and it is ok to work on this somewhere else, for example at MIF WG

- Discuss if split-DNS needs to be specified and documented in DNSOP WG

- Solicitation for comments to improve the proposed solution and get terminologies & descriptions perfect