# IPv4 and IPv6 Dual-Stack Issues for DHCPv6
## draft-chown-dhc-dual-stack-00.txt

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# Introduction

- A dual-stack node may use DHCP to retrieve configuration settings

- Some settings are IPv4 or IPv6 specific

- Some settings may not be related to IP

- For e.g. DNS and NTP servers, there may be a mix of addresses

- Should the node use DHCP(v4), DHCPv6 or both to retrieve them?

- Currently DHCP(v4) returns IPv4 data, while DHCPv6 returns IPv6 data

# Dual-stack issues (1/4)

3.1. Multiple responses

☐ When using both DHCPv4 and DHCPv6 one gets two separate sets of configuration settings

☐ Should they be merged?

☐ Might specify values for same config setting
  ○ If lists, merge?
  ○ Precedence?

☐ May also be a problem when using other sources, e.g. config files

☐ Remarks:
  ○ Multiple sources problem is not new, e.g. DHCPv4 and config files
  ○ Also problem if say DHCPv4 and config files with IPv6 settings

# Dual-stack issues (2/4)

3.2. Multiple interfaces

☐ A node may run v4 and v6 on different interfaces

☐ Are settings obtained per interface or per node?

☐ Difficult to keep NTP server, DNS search path etc per interface

☐ Multiple sources problem for node settings

☐ Can DUID be of help if retrofitted to DHCPv4?

☐ Remark:
　○ Similar issues if try to do config per address family

# Dual-stack issues (3/4)

3.3. DNS load balancing
- One sometimes give lists of DNS servers ordered in different ways to different clients for load balancing
  - Responses from different DHCP(v4) and DHCPv6 servers problematic?

3.4. DNS search path issues
- In early deployment one may want to put addresses for IPv6 services under a separate domain

- E.g. a site with domain foo.com may use ipv6.foo.com for IPv6 services
- One will want v6 nodes (also dual-stack) to include ipv6.foo.com in search path

3.5. Administrative management
- In some deployments, IPv4 and IPv6 services may be administered by different people
- This may pose data consistency problems

# Dual-stack issues (4/4)

3.6. DHCP option variations

☐ Some options in DHCP(v4) are not available in DHCPv6 and vice-versa

☐ Some IP-version limitations, e.g:
- Only IPv4 addresses in DHCP NTP option
- Only IPv6 addresses in DHCPv6 NTP option

☐ Options may have different numbers and different semantics

☐ Might want to configure dual-stack nodes with two NTP servers one v4 and one v6

☐ Desirable for NTP option to carry list of addresses where some may be IPv4 and some IPv6?

☐ In general one could consider DHCPv6 options carrying mix of v4 and v6 addresses

3.7. Security issues?

# Potential solutions (1/2)

4.1 Separate DHCP servers

☐ Running separate DHCP(v4) and DHCPv6 servers may or may not be on same physical node

☐ Give some guidance for how multiple responses are handled or merged?

☐ Restrictions on administrator to maintain consistency?

☐ Tools (scripts) for administrator that can help with consistency.

  ○ Create separate config files from one common config?

4.2 Single DHCPv6 server

☐ Dual-stack nodes could use only DHCPv6 if DHCPv6 options can carry mix of IPv4 and IPv6 addresses

  ○ [Allocating IPv4 addresses to interfaces too?]

☐ IPv6-only node may receive IPv4 addresses that it does not want or are meaningless

# Potential solutions (2/2)

4.3 Administrative and other areas

☐ May need recommendations on some issues
- ○ E.g. not using different DNS name space for IPv6 services (ipv6.foo.com)

☐ Separate config files for v4 and v6 settings?
- ○ Like /etc/resolv.conf on UNIX systems
- ○ They can then be updated separately
- ○ Seems very complex
- ○ [Moves the integration/merging issues]

☐ Some differences between DHCP(v4) and DHCPv6 may not be reconciled
- ○ May not need to be