DHCPv4 and DHCPv6 in Dual-Stack networks

Tim Chown, Stig Venaas
tjc@ecs.soton.ac.uk

draft-ietf-dhc-dual-stack-merge-01

dhc WG, IETF65, Dallas, TX, USA
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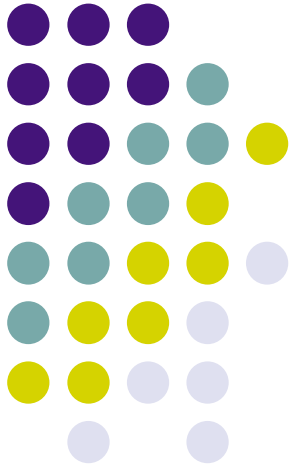
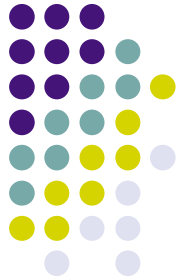
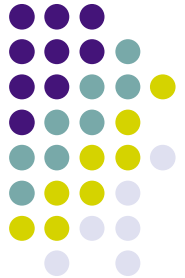


Previously…



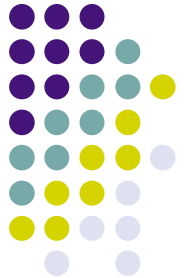
- Problem is to understand how a node should configure itself in a dual-stack environment, where both DHCPv4 and DHCPv6 may be used
- Issues documented:
  - draft-ietf-dhc-dual-stack-04 (in RFC Ed queue)
  - Concluded to use separate servers and merge data, rather than add IPv4 options to DHCPv6
  - Noted that deployment experience minimal
  - Next step to document merging ‘best practice’

Dual-stack scenarios



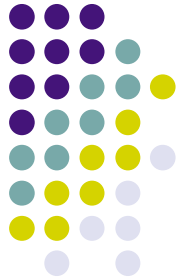
- May expect a ‘slow’ transition towards IPv6
- Dual-stack common in the interim
- Dual-stack on the wire
  - But not all services might be dual-stack
  - Probably see service by service upgrades
    - For example, DNS before NTP
  - Some links may be IPv4-only or IPv6-only
- Need to ensure configuration information is available and consistent across the site
  - Whether obtained via DHCPv4, DHCPv6 or both

Moving forward…



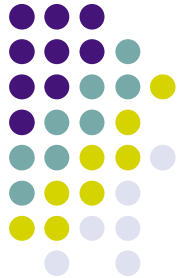
- The merge draft is in its formative stages
  - draft-ietf-dhc-dual-stack-merge-01
  - Lays out possible tools to use
  - Discusses approaches
  - No conclusions yet
- Need to review list of tools
- Decide any BCP recommendations
  - Draft would initially be Informational though
  - Because of (lack of) DHCPv6 deployment status

Potential tools



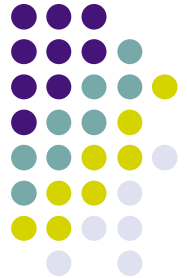
- Add a DHCP preference option
  - Server informs host which DHC service to prefer
- Add a client dual-stack indicator DHCP option
  - Host can inform server it is dual-stack and will use both protocols (so server could omit information)
- Use DUID
  - Server knows what information client already has
  - Possibly useful to use server DUID too (multihoming)?
- DHCPv6 option to tell client to use DHCPv4
- Use IPv4 mapped addresses in DHCPv6 response

Use of DUID?



- Client can tell DHCP server(s) that it will use both DHCPv4 and DHCPv6
  - Then server can omit information already provided by other protocol
  - May be difficult if DHCPv4 and DHCPv6 servers separate
- Can we also use server DUID usefully?
  - Set server DUID the same for DHCPv4 and DHCPv6 servers in one common administrative domain?
  - Multihomed case could then be detected by use of different server DUIDs?

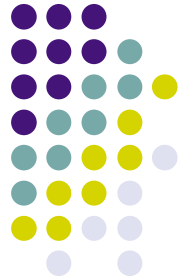
Where is the intelligence?



- Smartness in server
  - Inform server you are dual-stack
  - Use client DUID
- Smartness in client
  - Use preference option as hint for client

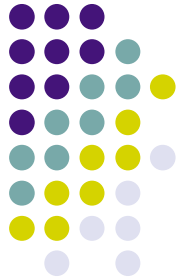
- Note: we assume in an administrative domain that DHCPv4 and DHCPv6 management is consistent
  - In practice should be common interface to administrator, even if DHCPv4/DHCPv6 services are not on same server

Mapped addresses



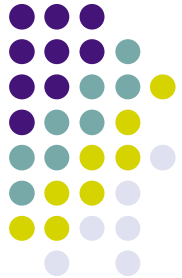
- The client preference option would allow lists to be sorted in a basic way
  - e.g. if two IPv4 DNS servers (dns4a, dns4b) and two IPv6 servers (dns6a, dns6b) are known about, and DHCPv4 is preferred, the list would be dns4a, dns4b, dns6a, dns6b
- Using IPv4 mapped addresses adds flexibility of a fully ordered list, if preferring DHCPv6, e.g.
  - dns4a, dns6a, dns4b, dns6b
  - Do we need that flexibility?
- Considered by some an ‘ugly’ solution
  - Note: we are not passing mapped addresses on the wire

Resilience



- What about resilience?
  - If we use server smartness, and omit the IPv6 NTP server information in a DHCPv4 reply to a client that has already used DHCPv6, what happens if IPv6 connectivity fails?
- This implies we should use the preference option and supply the client with all information?
  - i.e. client must remember DHCPv4 and DHCPv6 server replies and remember preference option
  - This may be natural for some services, e.g. the order in which entries are put into /etc/resolv.conf for DNS

So…



- We need to discuss the way forward
- Is the set of tools complete?
  - Anything that should be added or struck off?
- Which solution path should we take?
  - Client or server intelligence? Both?
  - Need to handle IP version resilience?
- Is this work timely?
  - DHCPv6 deployment minimal - limited experience

- Comments?