

DHCP as a routing protocol?

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Device Configuration Architecture...



DHCP: The Hammer for Every Screw!
– David Ward, 3/23/2009

"DHCP as a routing protocol"

- Dave Ward: "I am quite concerned that DHCP is about to become a dynamic routing protocol"
- Purpose of this talk is to discuss some considerations in the use of DHCP and other protocols in device configuration

Examples...

- Routing information between home gateway (HGW) and SP edge router
 - Inject routes for delegated prefixes
`draft-ietf-dhc-dhcpv6-agentopt-delegate`
 - Inject routes for non-default edge routers
`draft-dec-dhcpv6-route-option`
- Interface, outbound router selection for hosts with multiple interfaces
 - Several drafts published in anticipation of mif BOF

Information Flow

- Information flow: "producer/consumer"
 - Where does the information come from?
 - Initially
 - Updates
- Where does the information go?
- How is the information distributed?
 - Producer to distribution
 - Distribution to consumer

How dynamic is the information?

- Dynamic nature of the information
 - Does it change?
 - How frequently?
 - Do changes need to be pushed?

Scale

- Number of producers
- Number of consumers
- Full PxC mesh?
- Amount of information

Architecture

- "hosts" don't participate in routing protocols...
...because it's a bad idea or because we don't have the right mechanism?; e.g.,
 - DHCP: centralized, low update frequency, no async push, scales to 1 server and millions of clients
 - RIP: localized, rapid update frequency, "not so good" scale
- Side effects, brittleness; e.g., DHCP snooping for passing information to network elements
- "IPv4 should work just like IPv6"

Other thoughts

- "Host" versus "router" has become blurred
- Spectrum of considerations and issues to consider in each case
- DHCP: attractive nuisance or available and useful tool?
- Lots of cases coming forward; "customer" WGs need to consider alternatives and document justifications

New Mechanism Needed?

- Some deployments have requirements that don't map to any existing delivery mechanism...
- For example, route insertion from SP network into HGW routers:
 - Unidirectional from SP to HGW
 - Potentially huge scale
 - Need to push changes from SP to HGW routers

DHCP applied to this problem

- Information source: set of SP edge routers
- Distribution: through central DHCP configuration store
- Delivery: unidirectional from DHCP server to HGWs
- Scale: DHCP service already scales to CPE configuration
- Dynamic updates: must propagate from SP edge routers to DHCP service; still no good way to push from DHCP service to HGWs
- Ease of deployment: DHCP already used for delivery of other configuration to the HGW

Essay Question:

- Does the community believe that using DHCP for this functionality is inappropriate and we have an internet architectural issue to solve? Justify your answer.