Softwires for DHCP

Threat or danger?

Motivation

- Several bits of related work require DHCP
  - Lightweight 4over4
  - MAP-E
  - Public 4over6
  - Unified CPE
- These drafts all involve
  - an IPv4 node
  - completely isolated on an IPv6 network
  - needs some IPv4 configuration anyway

Observations

- These devices need three types of configuration
  a. IPv6 network configuration
  b. IPv4 network configuration
  c. Basic service configuration (DNS, etc)
- If all we need of (c x b) is DNS, DHCPv6 is fine
- Nobody has made a convincing case that this is all we need.

State of play

- Various groups have running code
- Softwire participants have lobbied DHC heavily
- Many requirements have been stated
- Many of them aren't technical
- Many of them are specific to particular use cases, and not general
- Many of them don't even make sense

What are we trying to do

- Produce a new softwire technology?
- Extend DHCP?
- Come up with a solution that generalizes well?

What are the pieces?

- Home gateway
  - This is a new device, bc it supports unified CPE
- PE gateway
  - Hopefully just a PE router, nothing fancy
- Intermediate routing infrastructure
  - IPv6-only
- Network configuration engines
  - DHCPv6
  - DHCPv4?
- Provider provisioning systems

What does this look like

- Provider enters configuration into network provisioning system
- Network provisioning system pushes configuration out to *Configuration Engine X*
- HG sends PD request (NA? SLAAC?)
- *CEX* configures HG IPv6 stack over DHCPv6
- HG sees that it needs to do some UCPE thing
- Does HG request additional information, or did it get all it needed in initial configuration exchange

Basic scenarios

a. HG gets its entire configuration in initial exchange
b. HG requires additional information in subsequent exchange

- Obviously (a) is cleaner, *but*
- What if client needs more IPv4 configuration than just an address and port mapping algorithm?

The Problem

- If the client needs more configuration than just an IPv4 address and a port set, we have to carry IPv4 configuration information in DHCPv6
- If we configure IPv4 addressing via DHCPv6, we need additional signaling for address lifetimes in DHCPv6
- Architecturally, this is a kludge.

Proposed solutions

- Do the kludge—we promise not to ask for more IPv4 options
- Do the kludge, live with new IPv4 option problem
- Somehow leverage existing DHCPv4
  - Existing DHCPv4 solution is also a kludge
  - Can we leverage existing DHCPv6 infrastructure to carry IPv4 messages?

Objections

- Don't want DHCPv4 infrastructure
  - None of the proposed solutions require DHCPv4 infrastructure—no DHCPv4 relays, no IPv4 service on the PE, intermediate network, or even in the data center.
- Don't want to have to configure two servers from the provisioning system
  - DHCP servers from Nominum, Cisco, ISC (?) support both protocols in one engine with unified configuration
  - Why is this an issue?

Plea for sanity

- This isn't a hard problem
- There are no clear technical wins here
- Chances are that everybody's running code is going to wind up on the trash heap of history
- So let's be brave
  - Stop worrying about running code
  - Treat operational issues as black box issues, not specific protocol requirements
  - Have a sincere discussion about how to solve this