Reverse-DNS Naming Convention for CIDR Address Blocks

draft-gersch-dnsop-revdns-cidr-01

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3/30/12
How Do You Represent a CIDR Prefix in Reverse DNS?

• Conventions exist for representing IP addresses
  – Both IP v4 and IPv6
  – 129.82.138.2 => 2.138.82.129.in-addr.arpa

• Conventions for representing a prefix?
  – Neither IPv4 or IPv6
  – 129.82.138/24 => ????
  – No guidance limits innovation and leads to fractures
What Doesn’t Change

• No request for a new record type
• No change in any DNS resolver
• No change in any DNS server
• No change in any DNS cache
• No change in DNSSEC processing
• Not mandatory to use it

We seek only a prefix naming convention
But Doesn’t This Already Work?

• Why not just treat a prefix like an address?
  – 129.82.0.0/16 => 16/0.0.82.129.in-addr.arpa

• Authority for data is in the wrong zone
  – 129.82.0.0/16 owned by Colorado State Univ
  – 129.82.0.0/24 delegated to small department
  – 16/0.0.82.129.in-addr.arpa belongs to small department

• Does not handle CIDR masks:
  – 129.82.128.0/17 => ???
  – RFC 2317 and others don’t apply to prefixes
Prefix Chaining: The Main Idea

• Use the existing reverse tree whenever possible

• Switch to binary when you are off an octet boundary

• Result adds to existing reverse DNS tree while also preserving prefix hierarchical structure
Prefix Chaining – Step by Step

• Step 1: Drop the unnecessary octets
  – 129.82.0.0/16 \rightarrow 129.82

• Step 2: Calc the prefix length mod 8
  – 16 \text{ mod } 8 = 0

• Step 3: If N=0, reverse and append
  – m.82.129.in-addr.arpa
Prefix Chaining – Step by Step

• Step 1: Drop unnecessary octets
  – 129.82.64.0/18 → 129.82.64

• Step 2: Calculate the prefix length mod 8
  – 18 mod 8 = 2

• Step 3: If N != 0, expand bits
  – Insert m before last octet
    • 129.82.64 → 129.82.m.64
  – Convert last octet to binary
    • 129.82.m.64 → 129.82.m.01000000
  – Truncate to L mod 8 bits, reverse, and append
    • 129.82.m.0.1.00000000 → 1.0.m.82.129.in-addr.arpa
129.in-addr.aprpa

82.129.in-addr.aprpa
  m.82.129.in-addr.arpa RR data

  1.0.m.82.129.in-addr.arpa NS ns1
  1.0.m.82.129.in-addr.arpa NS ns2

1.0.m.82.129.in-addr.aprpa
Summary

• No convention for naming a CIDR prefix
  – A convention would help innovation and prevent fracture (classic standards case)
  – Should be application agnostic
  – No protocol or implementation changes

• Proposed such a naming convention
  – No major changes suggested
  – Many minor changes suggested. Thanks!