An Anycast Federation for DNS Resolvers

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Where are people using public resolvers?
https://stats.labs.apnic.net/rvrs
Learning from the source
Main points we have learned so far

• Hosting place is challenging for resolvers
• Public resolvers are beneficial
• DNS is not a priority, and lack of specialized DNS people
• Small operations ignore best practices for DNS (eg KINDNS)
• They are reactive (eg., open resolvers)
• Public resolvers are 20-80ms far away
• Target is 5ms for structured operations

• Up to now, we have talked to:
  • 35 small ISPs (10-50k users),
  • 1 medium ISP (80k users),
  • 2 universities
  • 1 academic network,
  • 1 private DNS anycast provider
  • 2 global public resolvers

• South America and Africa
Best case scenario: Worldwide cities with at least one datacenter providing hosting (5ms < 300 km)
How Anycast Federation works

A Federated Host is a network of servers that can route traffic to different public resolvers based on the location of the end user. In this example:

- **ISP / University Datacenter-A**
- **Public Resolver-X**
- **Public Resolver-Y**

The local resolver communicates with the federated host, which then routes traffic to the appropriate public resolver based on the end user's location. The diagram shows:

- End users A, B, and C connecting to the local resolver.
- Traffic from the local resolver to the federated host.
- The federated host routing traffic to either Public Resolver-X or Public Resolver-Y.
- The time delays indicated (1 ms, 50 ms, 10 ms) represent the latency between different points in the network.
How the Broker works

1. Offer Datacenter-A Location
2. Accredit Datacenters and Services
3. Select services Resolver X and Y
4. Notify Datacenter-A want to host Resolver-X
5. Accept Datacenter-A Terms
6. Install Service on Federated Host at Datacenter-A
Discussion and Challenges

• How to facilitate the entry of new players in the DNS market?
• How to make it attractive for hosting institutions?
• How to make attractive for DNS service providers?