RcodeZero DNS

www.rcodezero.at

2017-09-15 · Alexander Mayrhofer · Head of R&D
RcodeZero Anycast DNS

**TLD-DNS**
14 TLDs, ~2.8M Domains (.at, .pt, .hu, .si, .berlin, .gdn ..)

**ISP/Enterprise**
~740,000 Domains

**24 Locations**
2 independent clouds

**DNSSEC**
bump-in-the-wire / API
Motivation / why our own network?

• Small (internal) Anycast networks for .at
  – If we can do it at small scale, we can do it at larger scale

• Backend Registry Operator for gTLDs
  – Offer the „full package“

• High quality DNS became a burden for Registrars
  – Secondary DNS can be a product

• DNSSEC is complex
  – (Smaller) registrars like to outsource it
Our Network(s)

- 2 independent clouds (Infrastructure / Upstream)
  - (plus 2 additional „minicast“ clouds, specifically for some new gTLDs)
- Aug 2017: +Stockholm, Sweden
Operational aspects – optimization!

• Setting up the network is one thing
• Tuning it is a very different kind of beast
  – „Looks good on the map“ vs. „Actually makes sense“
  – Choose your locations & upstreams very very wisely

• Goal Definitions
  – Perfect availability (of course!) – DNS itself is already *very* resilient!
  – Minimize RTT – „Yalla yalla“ 😊

• Keep traffic on the same continent
  – Network Topology vs. Geography – „in-continent“ can be very complex
  – But: Continent Hops are always „expensive“ in terms of RTT (and ugly on maps, too!)
Optimization Tools

- Using RIPE atlas / OpenIPMap
- Traffic stays „on continent“
- East coast / west coast
- Traceroutes make sense
- RTTs are low
Example: Suboptimal Routing?

- LA probe should go to San Jose!
- Seems to go to Seattle instead
- What’s the issue?
Geocoding issue, not Routing ...

- Turns out IP address geolocation is wrong
- IP address seems to be in Seattle, not LAX
- So, Routing is perfectly fine, visualization is misleading
How we would think the Internet works...
And how it actually works..
Summary / Recommendation

• Anycast is state of the art for TLDs
  – Very useful, but complex to build
  – Don’t build it just for yourself (we wouldn’t have done it for .at only either)

• Combine several Anycast networks (that’s why we built 2!)
  – Increase diversity
  – Combine geo coverage
  – Organizational resilience

• Talk to us - we’ve done it 😊
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https://youtu.be/y0if6D6lC4o