IETF 97

Bundled Domain Names

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The Problem(s)

- Domain names map poorly onto human names and terms
- We want several names to work “the same”
- We don’t understand how to do that
- We don’t understand what “the same” means
In and out of scope

IN
❖ Handle modest groups of names
❖ Automate bundle management

OUT
❖ Huge groups of names
❖ $M^N$: $M$ variants per character, $N$ characters
Some scenarios

- Bundled 2LD variants
- TLD variants
- Parallel TLDs
- Individual trees
Bundled 2LD variants

- TLDs that bundle lexicographic variants
- Chinese: traditional and simplified
- Roman: accented and unaccented
- Greek: final ζ in Νίκος.gr / ΝΙΚΟΣ.gr / Νικος.gr
- Usually implemented with common DNS
- .gr uses DNAMEs, .cat did but switched
TLD variants

- Lexical variants of TLDs
- Example: .台灣 and .台灣
  - Currently implemented with DNAME
    - xn–kprw13d. IN DNAME xn--kpry57d.
Parallel TLDs

- TLDs that may be equivalent
- .中国 and .中國 have same NS, intended to have same contents
- .NGO and .ONG have same NS, not required to have same contents
Individual trees

- Separately registered names for the same entity
  - bigcorp.com / bigcorp.net
  - bright-color.cc / bright-colour.cc
- Up to the registrant to make it work
Subtrees

- Bundled names can occur at any level
- Exponential explosion

![Diagram showing subtrees with bundled names at various levels]
DNS and Applications

- Even if DNS is set up right, applications often fail
- Same DNS for fóó.biz and foo.biz, but Web server for http://fóó.biz doesn’t handle http://foo.biz
- Similar problems for e-mail, anything that uses SRV
- Can applications configure themselves automatically?
Current approaches

- Parallel NS
- CNAME
- DNAME
Approach: parallel DNS

- Same name servers for all names in bundle
- Depends on DNS manager to keep zones in sync
- In practice, they don't
Approach: CNAMEs

- Parallel NS but one zone has CNAMEs at every name
- Operationally awful, no better than parallel DNS
- Doesn't work with SMTP MX
- Delegated subtrees a problem
- Zone has no control over who points CNAMEs at it
Approach: DNAMEs

- Doesn’t handle the name at the DNAME
- OK for TLDs 台湾 and .台灣
- Fatal flaw for 2LDs, didn’t work in .cat
- Same SMTP MX problems
- Delegated subtrees don’t work
- Zone has no control over who points DNAMEs at it
Proposed solutions

- BNAME
- CLONE
- Arc-pointers
Proposal: BNAME

- New RRTYPE BNAME
- Effect similar to CNAME+DNAME
- See draft-yao-dnsext-bname-06
Proposal: CLONE

- New RRTYPE: CLONE name1 name2 ...
- Authoritative server synthesizes name1, … records parallel to current zone
- Clone-aware cache can synthesize too
- See draft-barton-clone-dns-labels-fun-profit
- Avoids B/C/DNAME control problem
Proposal: Arc-pointers

❖ Slightly different question: can a single Internet name space have multiple resolution systems? (Think .onion)
❖ Pointer system within the DNS references alternate resolution systems that handle a part of the namespace.
❖ Bundled names have one set in the DNS, others in alternate system. Transform before re-consulting DNS is alternate resolution, e.g., .color.example -> .colour.example
❖ See draft-hardie-arc-pointers, notes risks & downsides.
Application issues

- When Web and mail servers see mystery domain names
  - Do DNS lookup to see if it’s a BNAME/CLONE/…
  - Treat mystery name as known bundled name
- Is this a good idea?
  - Security issues from CNAME/DNAME/BNAME
  - TLS certificate names?
Next steps?