

NAPTR Resource Record

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Overview

- Main Principle of Knoxville Framework -
Separation of Name Assignment and
Resolution Hierarchy
- Implies that we need to be able to change
form of names into what is needed for
various resolution systems
- DNS is a good candidate for an early
resolution system since it is so widely
deployed.

NAPTR Structure

Domain TTL Class Order Flags Service Pattern

Order

 Order in which to process multiple responses, used for delegating portions of namespaces

Flags

 Modifiers for the resolution process, typically for optimizations.

Service

 Protocol to speak and resolution services that will be available.

Pattern

 Rewrite rule for URN - replacement or regexp substitution

Example 1 - CID Namespace

 The URN:

```
urn:cid:199606121851.1@gatech.edu
```

 First DNS Query:

```
lookup(type=NAPTR, "cid.urn.net");
```

 First DNS response

```
;;          order flags service (pattern)
cid.urn.net IN NAPTR 10  ""          ""
              "/.+@([\^@]+)/\1/i"
```

Example 1 (cont.)

Second DNS Query

```
lookup(type=NAPTR, "gatech.edu");
```

Second DNS Response

```
gatech.edu IN NAPTR
```

```
10 "s" "z39.50+N2L+N2C" "_z3950._tcp.gatech.edu"
```

```
20 "s" "rcds+N2C" "_rcds._udp.gatech.edu"
```

```
30 "s" "http+N2L+N2C+N2R" "_http._tcp.gatech.edu"
```

Example 1 (cont.)

Third DNS Query

```
lookup(SRV, "_z3950._tcp.gatech.edu");
```

Third DNS Response

```
_z3950._tcp.gatech.edu  
IN SRV 0 0 1000 z3950.gatech.edu  
IN SRV 0 0 1000 z3950.cc.gatech.edu  
IN SRV 0 0 1000 z3950.uga.edu
```

 Connect via protocol:port and query the service for information about the URN

Example 2

The URN:

```
urn:duns:002372413:annual-report-1997
```

The First DNS Query

```
lookup (NAPTR,"duns.urn.net");
```

The First DNS Response

```
; order flags service pattern
```

```
duns.urn.net NAPTR
```

```
10 "s" "dunslink+N2L+N2C" "_dunslink._udp.isi.dandb.com"
```

```
10 "s" "rcds+N2C" "_rcds._udp.isi.dandb.com"
```

Example 2 (cont.)

Second DNS Query




```
lookup(SRV, " rcds._udp.isi.dandb.com");
```

Second DNS Response

```
;;          Pref Weight Port  Target
rcds._udp.isi.dandb.com
  SRV 0      0          1000  defduns.isi.dandb.com
  SRV 0      0          1000  dbmirror.com.au
  SRV 0      0          1000  ukmirror.com.uk
```

 Then contact the service on the host:port

Accomplishments/ Work in Progress

-  BIND 4.9.5 code available soon
-  C Library for clients
-  Apache caching proxy support soon

Outstanding issues

Security

 What does DNSSEC solve and not solve?

 What are the possible threat models?

 Which ones can we do something about?

Management of names and evolution

 What to do when exceptions are the rule instead of the exception?

 Initial publication and software to manage namespaces

Outstanding Issues (cont.)

Fixing DNS?

 What are the things we would like to see in a registry optimized for URNs?

 Can they be put into DNS?

Non-persistence/movement of DNS domains?

 mtv.com