RDAP: A Primer on the Registration Data Access Protocol

Andy Newton, Chief Engineer, ARIN
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Background

• WHOIS (Port 43)
  – Old, very old
  – Lot’s of problems
    • Under specified, no I18N, insecure, no authentication, etc…
RIRs Begin To Play with RESTful Whois Services

• ARIN
  – Pilot in October 2009
    • Flash and AJAX apps written against it by unknown parties
  – Full Production as of July 2010

• RIPE NCC
  – Announced their RESTful proxy to Whois March 2010
  – Now in production
RESTful Whois Becomes Quite Popular

(ARIN's monthly totals over time)
ICANN / IETF Take Notice

- IETF 81 (July 2011) - Bar-BOF
- IETF 82 (November 2011) - Official BOF
- IETF 83 (March 2012) - WG Formed
- IETF 92 (March 2015) - RFCs Published
  - RFC 7480 - Usage of HTTP by RDAP
  - RFC 7481 - Security Considerations
  - RFC 7482 - Query Format
  - RFC 7483 - JSON Responses
  - RFC 7484 - Bootstrapping
The Facets of RDAP

• The Protocol
• Queries
  – Lookups
  – Searches
• Response
  – Discreet result objects
  – Search results
• Security
• Bootstrapping
• Extensibility
The Protocol

• HTTP <= 1.1 GETs and HEADs
  – No PUTs, POSTs, or DELETEs defined
  – Queries are in the URLs

• HTTPS or HTTP
  – HTTPS highly preferred

• Standard HTTP return codes
  – 200 OK, etc..
  – 3xx Redirects and 4xx errors may have entity bodies
  – Clients can evaluate codes only or look at entity bodies
Queries in the URL

http://rdap.apnic.net/ip/1.1.1.1

http://rdap.db.ripe.net/ip/1.1.1.1

http://rdg.afilias.info/rdap/domain/dog.info

http://rdap.arin.net/registry/entities?fn=Newton*
Lookups

- CIDR or IP (which is just CIDR with 32 or 128 length)
  - Most specific net enclosing
- Autonomous System Number
- Domain name
- Nameserver host name
- Entity by handle
  - Handle is a registry unique identifier
- And /help
Searches

• Domains
  – By partial domain name match
  – Hostname of nameserver
  – IP address of nameserver

• Nameservers
  – By partial hostname match
  – By IP address

• Entity
  – By partial "natural name" match
  – By partial handle match
JSON Response

Searches

Search Results

Lookups

Object Classes

Common Data Structures

Common Data Types
Security

- All sorts of possibilities when re-using HTTP
  - That's what RFC 7481 says
- Nothing defined - YET!
Bootstrapping

• Or... how to find the right server for a query
• IANA will periodically publish bootstrap JSON files
  – http://data.iana.org/rdap/asn.json
  – http://data.iana.org/rdap/ipv4.json
  – http://data.iana.org/rdap/ipv6.json
  – http://data.iana.org/rdap/dns.json
• Client will periodically go fetch them
Bootstrapping in the Real World

• Bootstrap servers help clients, especially clients running in a constrained environment such as a web browser
• Can be more helpful than the official IANA bootstrap files
  – Formulating Reverse DNS redirects
  – Synthesizing Nameserver redirects
  – Educated guesses regarding authoritative servers for Entities
Bootstrapping for DNRs

Client

Bootstrap Server

DNR

Dog.info?

Ask Affilias

JSON

Dog.info?
Bootstrapping for RIRs

Client

Bootstrap Server

Ask ARIN

45.65.1.1?

Ask APNIC

45.65.1.1?

JSON

45.65.1.1?
Extensibility

• To add new JSON stuff
  – Write a specification (doesn't have to be an RFC, can just be a web page)
  – Registry your JSON prefix
  – Go for it!

• Status values, role type, etc... defined in an IANA registry
  – Just go register new values
Implementation Gotchas

- 'objectClassName' - MANDITORY
- 'fn' attribute in Entity jCards - MANDITORY
- Self links required for client-side caching
  – And you do want client-side caching, right?
Where Are We?

• APNIC, LACNIC, ARIN - In Production
  – ARIN also running a bootstrap service
• RIPE NCC, AFRINIC - Pilots Available
• Afilias (.info) - Pilot Available
• CNNIC (.cn) - Pilot Available
• .cz and .br - ??
• IANA - In Production
What Do We Have?

- Registry servers from RIPE NCC, DNSBelgium and CNNIC and possibly NIC.br
- Clients from ARIN, DNSBelgium, CNNIC, and CentralNIC and possibly NIC.br
  - "gem install nicinfo"
- Bootstrap Server from ARIN
- Conformance Testers from Viagenie, APNIC, and LACNIC
QUESTIONS ANSWERED HERE EVEN THE SILLY ONES