IETF Update on RDAP

ICANN52 Singapore CCTLD Tech Day

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From Whois to RDAP

• RDAP:
  - Registration Data Access Protocol
  - replacement of whois
  - structured data (JSON)
  - modern query method (http RESTFUL)
  - flexible and modern data structure (i18n,...)
  - AAA
  - Combined Numbers and Names access protocol
  - ...

• See good summary (Scott Hollenbeck, Circleid, http://www.circleid.com/posts/20150121_where_do_old_protocols_go_to_die/)
(Incomplete) RDAP in 3 slides

(for people who know what whois is)
RDAP Query

- **Numbers:**
  - https://example.com/rdap/ip/192.0.2.0/24
  - https://example.com/rdap/ip/2001:db8::0
  - https://example.com/rdap/autnum/12
- **Names:**
  - https://example.com/rdap/domain/blah.example.com
  - https://example.com/rdap/domain/xn--fo-5ja.example
  - https://example.com/rdap/domain/2.0.192.in-addr.arpa
- **Others:**
  - https://example.com/rdap/nameserver/ns1.example.com
  - https://example.com/rdap/entity/MY-HANDLE
- **Search:**
  - https://example.com/rdap/domains?name=example*.com
RDAP Response

```json
{
  "entities": [
    {
      "handle": "100001-RR",
      "links": [
        {
          "href": "http://rdap.example.org/rdap/entity/100001-RR",
          "rel": "self",
          "type": "application/rdap+json",
          "value": "http://rdap.example.org/rdap/entity/100001-RR"
        }
      ]
    }
  ]
}
```

... 378 lines later... (pretty printing), or 7800 octets later.
```
RDAP Response

- Returns:
  - handles
  - objects (numbers, names, ns, )
  - links (hrefs...)
  - notices/remarks (terms of use, unauthorized access, server is down for maintenance,...)
  - events (created, last-changed, ...)
  - entities (as vcards in json)
  - status (locked, ...)
  - dnssec
  - ...
Ok, but where do I send the query to?
Bootstrap

• Problem: how to find the authoritative RDAP server for this object.
  – reliably (from authoritative sources)
  – dynamically (when a new tld, address prefix, ... is just assigned)
  – flexible: allows various services (https and http, ...)
Bootstrap

• Different methods were looked at.
  – in-DNS: RR at the apex; in a separate tree.
  – IANA registry

• Evaluated based on various criteria, such as:
  – capability to be used in Javascript
  – no dependency on new RR records
  – “simple”

• None was “perfect”. Choose the least pain (hopefully)
Bootstrap

- IANA registry
  - using current IANA mechanisms with current assignees of objects. Modelled on how whois entries are updated.
- in JSON format
  - first IANA registry in JSON!
- Flexible
  - can do “anything” you want
- Simple
# Current Registries

## IANA IPv4 Address Space Registry

**Last Updated**
2014-10-14

**Registration Procedure(s)**
Allocations to RIRs are made in line with the Global Policy published at [http://www.icann.org/en/resources/policy/glo](http://www.icann.org/en/resources/policy/glo). All other assignments require IETF Review.

**Description**
The allocation of Internet Protocol version 4 (IPv4) address space to various registries is listed here. Originally, all the IPv4 address spaces were managed directly by the IANA. Later parts of the address space were allocated to various other registries to manage for particular purposes or regional areas of the world. RFC 1466 [RFC1466] documents most of these allocations.

**Reference**
[RFC7249](http://www.icann.org/en/resources/policy/glo)

**Available Formats**
- CSV
- XML
- HTML
- Plain text

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</tr>
</tbody>
</table>
# Current Registries

## IPv6 Global Unicast Address Assignments

**Last Updated** 2014-05-20  
**Registration Procedure(s)**  
**Description**  
The allocation of Internet Protocol version 6 (IPv6) unicast address space is listed here. References to the various other registries detailing the use of the IPv6 address space can be found in the [IPv6 Address Space registry](https://www.iana.org/assignments/ipv6-address-space).  
**Reference**  
[RFC7249]  
**Note**  
The assignable Global Unicast Address space is defined in [RFC4291] as being the address block defined by the prefix 2000::/3. All address space in this block not listed in the table below is reserved by IANA for future allocation.  

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<tbody>
<tr>
<td>2001::0000::/23</td>
<td>IANA</td>
<td>1999-07-01</td>
<td>whois.iana.org</td>
<td>ALLOCATED</td>
<td>2001::0000::/23 is reserved for IETF Protocol Assignments [RFC2928]. 2001::0000::/32 is reserved for TEREDO [RFC4380]. 2001::0002::/48 is reserved for Benchmarking [RFC5180]. 2001::10::/28 is reserved for ORCHID [RFC4845]. For complete registration details, see [IANA registry iana-ipv6-special-registry].</td>
</tr>
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<td>2001::db8::/32 reserved for Documentation [RFC3849]. For complete registration details, see [IANA registry iana-ipv6-special-registry].</td>
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Current Registries

United States
Email: wayne@unitedtld.com
Voice: +1 425 298 2260

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Registry Information

URL for registration services: http://rightside.co/rightside-registry/
WHOIS Server: whois.rightside.co
Bootstrap Registry Update Process

• Envisioned process:
  – add a new rdap entry into existing registries for IP address prefixes and root zone
  – through current mechanism to update tld or address prefix records, get the rdap info and publish it into the new entry of existing registries
  – and refresh (programmatically) the JSON registry with the new changes
# New Version of the Registries

## IANA IPv4 Address Space Registry

**Last Updated**
2014-10-14

**Registration Procedure(s)**
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New Version of the Registries

IPv6 Global Unicast Address Assignments

Last Updated
2014-05-20

Registration Procedure(s)
Allocations to RIRs are made in line with the Global Policy published at [http://www.icann.org/en/resources/policy/global-addressing]. All other assignments require IETF Approval.

Description
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Registry Information

URL for registration services: [http://rightsider.co/rightside-registry/](http://rightsider.co/rightside-registry/)  
WHOIS Server: whois.rightside.co
Bootstrap JSON Registry - Names

{
    "version": "1.0",
    "publication": "YYYY-MM-DDTHH:MM:SSZ",
    "description": "Names RDAP Bootstrap Registry",
    "services": [
        [
            [
                "net", "com"
            ],
            [
                "https://registry.example.com/myrdap/",
                "http://registry.example.com/myrdap/",
                "http://registry.example.com/myrdap/",
            ]
        ],
        [
            [
                "xn--zckzah"
            ],
            [
                "https://example.net/rdapxn--zckzah/",
                ...
Bootstrap JSON Registry - Numbers

{
    "version": "1.0",
    "publication": "2024-01-07T10:11:12Z",
    "description": "Numbers RDAP Bootstrap Registry.",
    "services": [
        [
            ["1.0.0.0/8", "192.0.0.0/8"],
            "https://rir1.example.com/myrdap/"]
    ],
    [
        ["28.2.0.0/16", "192.0.2.0/24"],
        "http://example.org/"
    ]
...
Redirect

• One can redirect to another URL using standard HTTP Redirect method
RDAP Non-IETF Activities
RDAP Interop and Test Suite

- Interop sessions were conducted during multiple IETF
  - ~10 different implementations
- using a comprehensive (spec conformance) test suite
  - suite acts as a client testing against an RDAP server
  - ~150 tests
  - later with a web interface
Example Output of Test Suite

Tests succeeded

<table>
<thead>
<tr>
<th>Test Case</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ta_query_3.1.2.35</td>
<td>OK</td>
</tr>
<tr>
<td>ta_query_3.1.2.36</td>
<td>OK</td>
</tr>
<tr>
<td>ta_query_3.1.2.38</td>
<td>OK</td>
</tr>
</tbody>
</table>

Test succeeded but with warning

<table>
<thead>
<tr>
<th>Test Case</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ta_query_3.1.3.1</td>
<td>WARNING</td>
</tr>
</tbody>
</table>

Click on test for detailed analysis

```
[REQUEST] {Accept: application/rdf+json}

RDAP Interop and Test Suite

- helped to find bugs in specs, various inconsistencies or to improve clarity
- test suite still available for new implementations. contact marc.blanchet@viagenie.ca to get access.
RDAP Workshop

- Registration Operations Group is planning to host an RDAP Workshop, Sunday prior to IETF 93.
  - Sunday July 19th, Prague, same venue as IETF
  - one on EPP scheduled for IETF92, March 22nd
- More info at http://regiops.net
- ML: http://nlnetlabs.nl/mailman/listinfo/regops
Conclusion

- RDAP: modern replacement of whois
- using http RESTFUL and JSON
- bootstrap through a JSON-formatted IANA registry
- Interop testing and test suite. Workshop coming.
- Now, let's implement and use it
References

- in RFC Publication Queue:
  - draft-ietf-weirds-bootstrap
  - draft-ietf-weirds-rdap-sec
  - draft-ietf-weirds-using-http
  - draft-ietf-weirds-json-response
  - draft-ietf-weirds-rdap-query