Whois-RWS: A RESTful Web Service for WHOIS

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What is REST?

• Representation State Transfer

• As applied to web services
  – defines a pattern of usage with HTTP to create, read, update, and delete (CRUD) data
  – “Resources” are addressable in URLs.

• Very popular protocol model.
  – Amazon S3, Yahoo & Google services, ...
Why Now?

• Major refactoring needed for current WHOIS services to accommodate data model changes necessary to support DNSSEC.

• Implementation of new service estimated to be just as much effort.
  – Reuse of ARIN Online components.

• Higher utility than just NICNAME/WHOIS.
How is this Useful to WHOIS?

• POC, ORG, NET, ASN resources have URLs that you can cut & paste.

• Gives a very simple programmatic API into WHOIS data.

• Compared to NICNAME TCP/43:
  – Better inputs and queries.
  – More meaningful array of outputs.

• Use of HTTP infrastructure (e.g. caches)
Where can more information on REST be found?

- RESTful Web Services
  - O’Reilly Media
  - Leonard Richardson
  - Sam Ruby
When will the Whois-RWS demo be available?

Now

http://whoisrws-demo.arin.net
The Parts of the Service

RESTful Web Service

NICNAME/WHOIS Port 43 Proxy

Web Form Interface

Database

ARIN HQ

* No clients written by ARIN
You Already Have Clients

This XML file does not appear to have any style information associated with it. The document tree is shown:

```
<poc>
  <ref>http://whoisrws-demo.arin.net/rest/poc/KOSTE-ARIN</ref>
  <city>Chantilly</city>
  <companyName>ARIN</companyName>
  <iso3166-1><code2>US</code2><code3>USA</code3></iso3166-1>
  <name>UNITED STATES</name>
  <e164>1</e164><e164>1</e164>
</poc>
```
Web Browsers

• Modern web browsers will do XSL transforms.
  – Unfortunately, we have not inserted the stylesheet into the XML.
  – Coming -- requires server software stack upgrade.

• Firefox will show formatted XML.
  – So useable today.

• All browsers can use the web form.
Command Line Clients

• Found on:
  – Unix and unix-like systems.
  – Cygwin for Windows and specific ports.

• curl – robust HTTP client
• wget – robust HTTP client
• xmllint – XML tool supporting HTTP
• xsltproc – XSL transformer supporting HTTP
NICNAME/WHOIS Clients

• We offer a port 43 proxy service.

• Very similar to our current NICNAME/WHOIS TCP/43 service.

• Use the host option with your favorite NICNAME/WHOIS client.
  - e.g. -h whoisrws-demo.arin.net

• But this is not RESTful.
An Example of Whois-RWS

$ xmllint --format http://whoisrws-demo.arin.net/rest/poc/KOSTE-ARIN

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<poc>
  <ref>http://whoisrws-demo.arin.net/rest/poc/KOSTE-ARIN</ref>
  <city>Chantilly</city>
  <companyName>ARIN</companyName>
  <iso3166-1>
    <code2>US</code2>
    <code3>USA</code3>
    <name>UNITED STATES</name>
    <e164>1</e164>
  </iso3166-1>
  <firstName>Mark</firstName>
  <handle>KOSTE-ARIN</handle>
  <lastName>Kosters</lastName>
...
Addressable URLs

• Mark Kosters
  http://whoisrws-demo.arin.net/rest/poc/KOSTE-ARIN

• ARIN (the organization)
  http://whoisrws-demo.arin.net/rest/org/ARIN

• ARIN’s autonomous systems numbers
  http://whoisrws-demo.arin.net/rest/org/ARIN/asns

• ARIN’s POCs
  http://whoisrws-demo.arin.net/rest/org/ARIN/pocs

• ARIN-HOSTMASTER’s networks
  http://whoisrws-demo.arin.net/rest/poc/ARIN-HOSTMASTER/nets
Searches

• Same capabilities as port 43, but they can be refined.

• Organizations by name
  http://whoisrws-demo.arin.net/rest/orgs/;name=ARIN

• Organizations starting with “ARIN”
  http://whoisrws-demo.arin.net/rest/orgs/;name=ARIN*

• Mark Kosters by first and last name
  http://whoisrws-demo.arin.net/rest/pocs/;first=Mark;last=Kosters
IP Addresses

• Simple addresses
  – 91% of all our WHOIS queries
    http://whoisrws-demo.arin.net/rest/ip/v4/192.149.252.254

• CIDR queries
  – Only available via REST
    http://whoisrws-demo.arin.net/rest/cidr/v4/192.149.252.0/24

• Relative CIDR queries
  http://whoisrws-demo.arin.net/rest/cidr/v4/192.149.252.0/24/less
Outputs

• XML

• JSON

• With stylesheets, you can transform the output to your needs.

• We provide some XSL stylesheets for translation to make XML look like traditional WHOIS.
Output Transformation

$ xsltproc \
  http://whoisrws-demo.arin.net/xsl/detailed-template.xsl \
http://whoisrws-demo.arin.net/rest/poc/KOSTE-ARIN

Name:                  Kosters, Mark
Handle:                KOSTE-ARIN
Company:               ARIN
Address:               3635 Concorde Parkway
City:                  Chantilly
StateProv:             VA
PostalCode:            20151
Country:               US
RegDate:               2009-10-02
Updated:               2009-10-02
Comment:              I'm really MAK-21-ARIN
Email:                 markk@bjmk.com
Phone:                 +1-703-227-9870 (Office)
The Future Enabled: Caching

- Addressable URLs make HTTP caching work with WHOIS data.
- Useful for automated security analysis.
- 91% of WHOIS queries are IP address lookups.
# The Future Enabled: Referrals

<table>
<thead>
<tr>
<th><strong>NetName</strong></th>
<th>ARIN-2610</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NetHandle</strong></td>
<td>NET6-2610-1</td>
</tr>
<tr>
<td><strong>NetType</strong></td>
<td>Allocated to Big Network Provider</td>
</tr>
<tr>
<td><strong>RegDate</strong></td>
<td>2005-11-17</td>
</tr>
<tr>
<td><strong>Updated</strong></td>
<td>2009-09-14</td>
</tr>
<tr>
<td><strong>CIDR</strong></td>
<td>2620::/23</td>
</tr>
<tr>
<td><strong>Ref</strong></td>
<td><a href="http://arin.net/rest/net/net/NET6-2610-1">http://arin.net/rest/net/net/NET6-2610-1</a></td>
</tr>
<tr>
<td><strong>HolderRef</strong></td>
<td><a href="http://example.com/rest/net/net/NET6-2610-1">http://example.com/rest/net/net/NET6-2610-1</a></td>
</tr>
</tbody>
</table>

- **Not just for Orgs**
  - **Nets**
  - **POCs**
  - **Etc…**

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- **NetHandle**: NET6-2610-1
- **NetType**: Allocated to Customer
- **CIDR**: 2620::/23
- **Comment**: Problems?
- **Commnet**: Contact our NOC +1-202-555-1212
The Future Enabled: Auth*

- Authentication allows tiered Authorization.
- Policies no longer need to assume all or nothing.
The Future Enabled: Versioning

• With standard HTTP headers, we can version our output.
  – Change data model with as little disruption as possible.

GET /whoisrws/seam/resource/rest/poc/DUDE1-ARIN HTTP/1.0
Accept: application/arin.whoisrws-v1+xml

  – Always get the latest if you don’t specify.
Documentation

- **http://whoisrws-demo.arin.net/docs/whoisrws-api.pdf**
  - Examples
  - Lists object types.
  - Explains the object relationships.

- **Mailing List**
  - Ask questions.
  - Provide feedback.
  - **http://lists.arin.net/mailman/listinfo/arin-whoisrws** to subscribe.
The Steve Jobs Moment

AND ONE MORE THING
Frequency of Updates

• With this demo, we are also featuring “near real-time” updates.

  – Data replicated from our registration database out to the Whois-RWS server every 10 minutes.

  – Made possible by re-using components developed for ARIN Online.
Feedback

At the microphone now.

Or join the mailing list:

- arin-whoisrws@arin.net
- http://lists.arin.net/mailman/listinfo/arin-whoisrws