

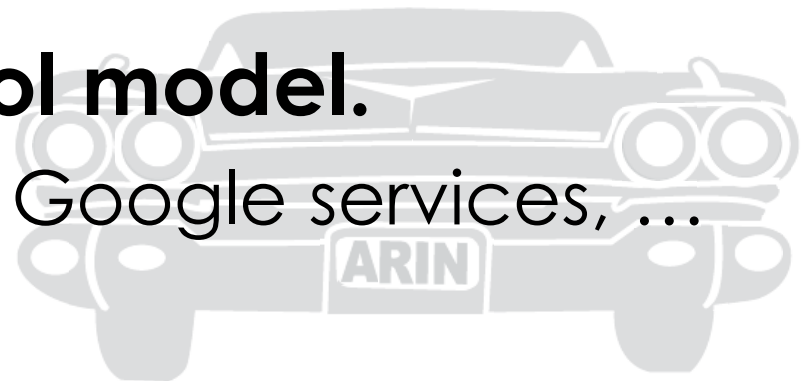
Whois-RWS: A RESTful Web Service for WHOIS

*Andy Newton,
Chief Engineer*



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



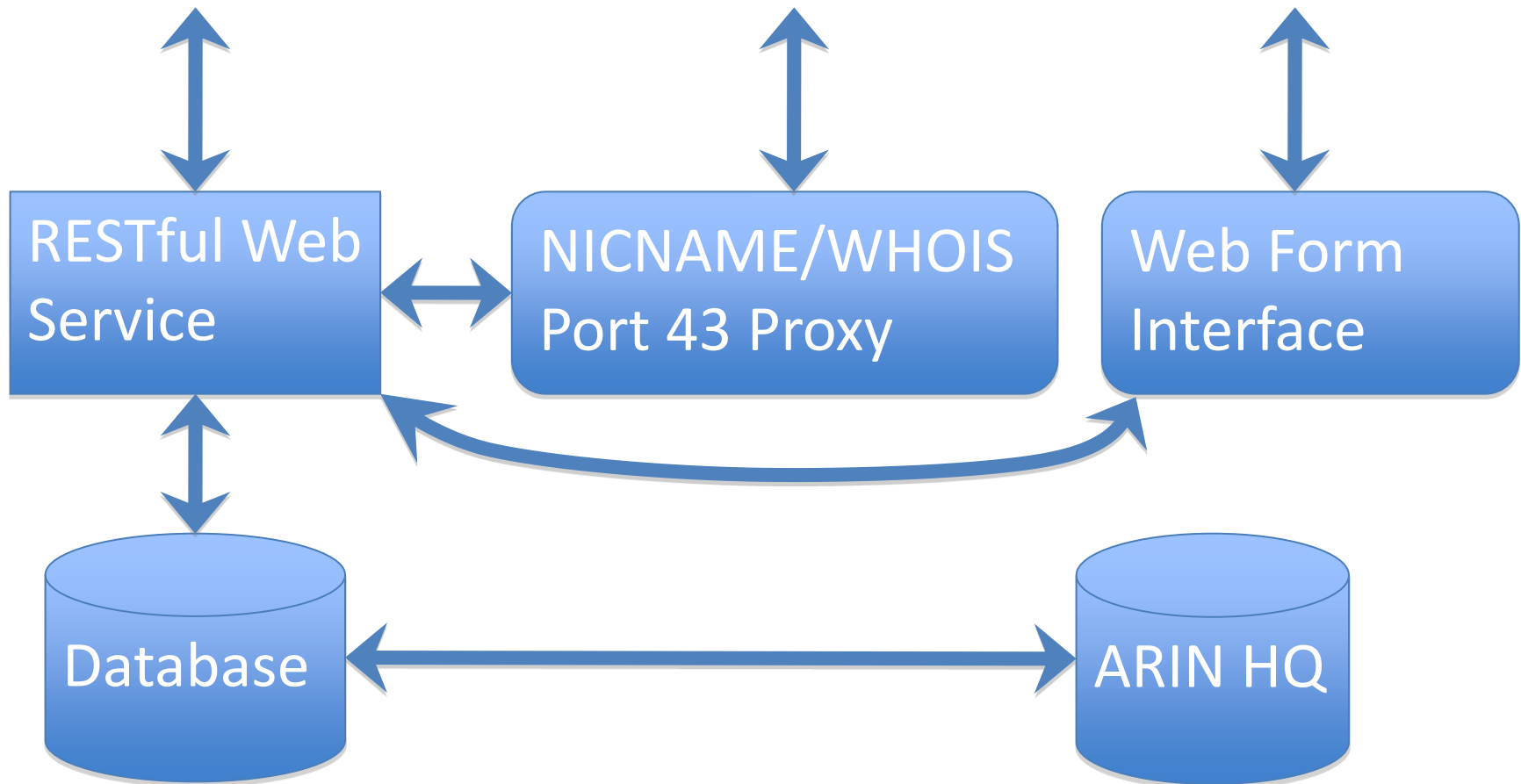
When will the Whois-RWS demo be available?

Now

<http://whoisrws-demo.arin.net>

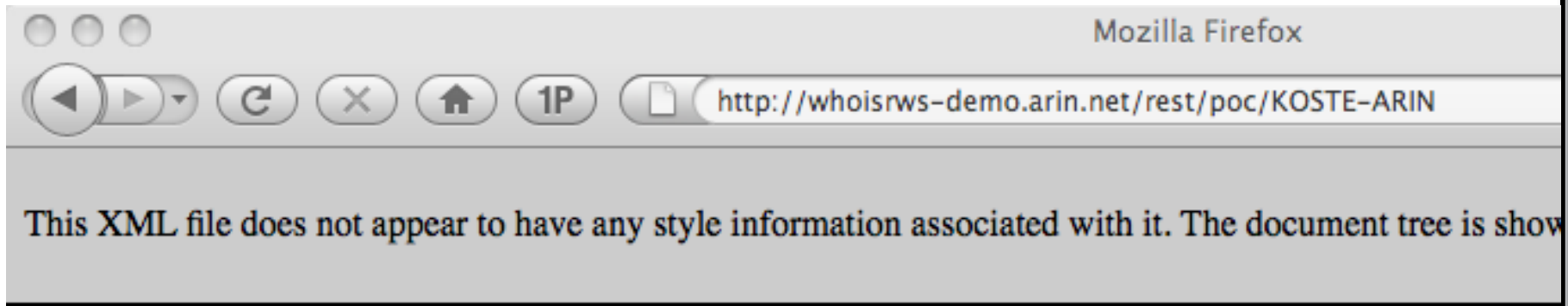


The Parts of the Service



** No clients written by ARIN*

You Already Have Clients



```
- <poc>
  <ref>http://whoisrws-demo
  <city>Chantilly</city>
  <companyName>ARIN</c
- <iso3166-1>
  <code2>US</code2>
  <code3>USA</code3>
  <name>UNITED STATE
  <e164>1</e164>
</iso3166-1>
<firstName>Mark</firstNa
<handle>KOSTE-ARIN</I
```

A screenshot of a terminal window titled "Terminal — bash — ttys003". The terminal shows the command `zx80:~ anewton$ xmllint --format http://whoisrws-demo.arin.net/rest/?xml version="1.0" encoding="UTF-8" standalone="yes"?` and its output, which is a formatted XML snippet:

```
<netBlocks>
  <limitExceeded limit="10">false</limitExceeded>
  <netBlock>
    <addressRange>
      <cidrLength>8</cidrLength>
      <endAddress>192.255.255.255</endAddress>
      <description>Early Registrations, Maintained by ARIN</descrip
      <type>AV</type>
      <startAddress>192.0.0.0</startAddress>
    </addressRange>
```


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**
- **xmlint – 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 Kusters**

<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>

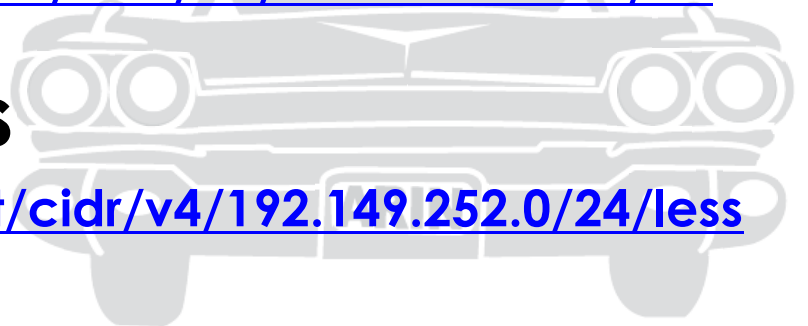
- **CIDR queries**

- 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:           Kusters, 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

```
NetName: ARIN-2610
NetHandle: NET6-2610-1
NetType: Allocated to Big Network Provider
RegDate: 2005-11-17
Updated: 2009-09-14
CIDR: 2620::/23
Ref: http://arin.net/rest/net/NET6-2610-1
HolderRef: http://example.com/rest/net/NET6-2610-1
```

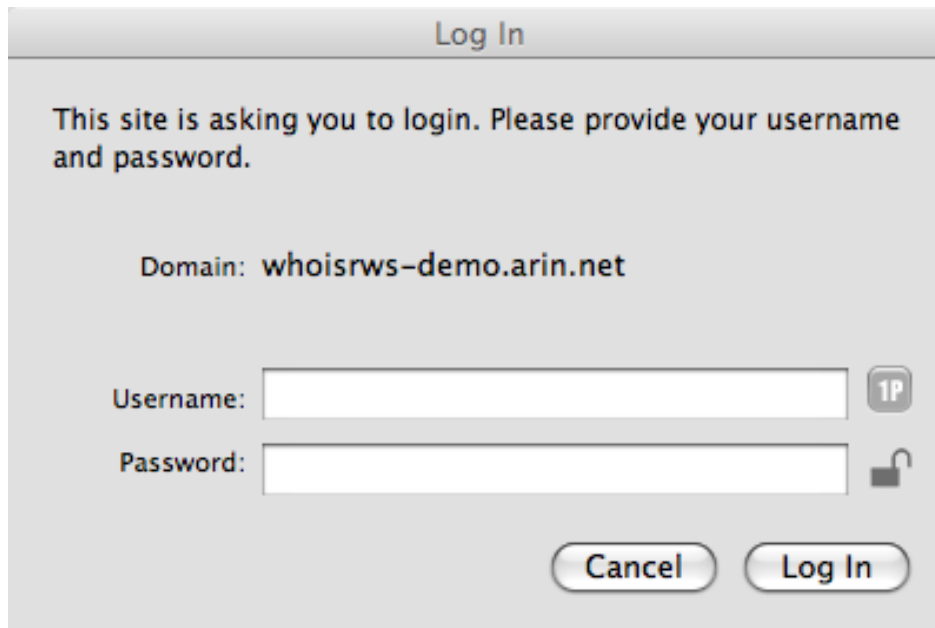
- **Not just for Orgs**

- **Nets**
- **POCs**
- **Etc...**



```
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*



Log In

This site is asking you to login. Please provide your username and password.

Domain: whoisrws-demo.arin.net

Username: TP

Password: 🔒

Cancel Log In

- **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.



ARIN XXIV • Dearborn, MI

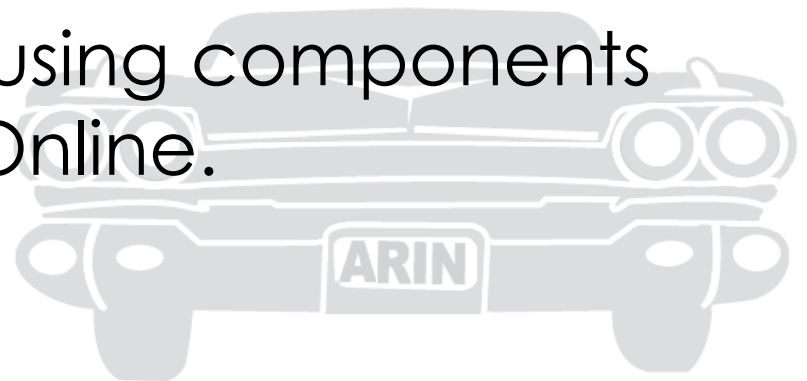
The Steve Jobs Moment

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>

