



ARIN Update and Whois-RWS: A RESTful Web Service for Whois

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Outreach Efforts

- ARIN continues to participate in various regional, national and international forums



- IPv4 depletion
- IPv6 adoption
- 4-Byte ASNs
- The RIR System
- Policy Development Process

Current Policy Proposal Discussions

- **Directory Service Changes**
 - Customer Confidentiality – ISPs to have the option of providing reassignment customer info
 - Standardization of registration requirements
- **IPv4**
 - Moving Minimum Assignment unit to a /24
 - Waiting list for Unmet IPv4 Requests – only one prefix every 3 months
 - Simplified Initial Allocations and M&A Transfer policy
- **IPv6**
 - Allow /48's to all requestors
 - Multi-homed Initial Allocation Criteria – allowing multi-homers get /32's
 - Simplified V6 allocation sizes /48, /40, /32, /28, /24

4-byte AS Numbers

- One year deferment on 4-byte ASNs
 - Default is to still hand out 2-byte ASNs
 - Policy was to automatically hand out 4-byte ASNs in 2010
- Issues raised at NANOG45
 - http://www.nanog.org/meetings/nanog45/presentations/Tuesday/Hankins_4byteASN_N45.pdf
- 4-byte ASN wiki
 - <http://www.get4byteasn.info>
- Complain to your vendors now if you do not have support.

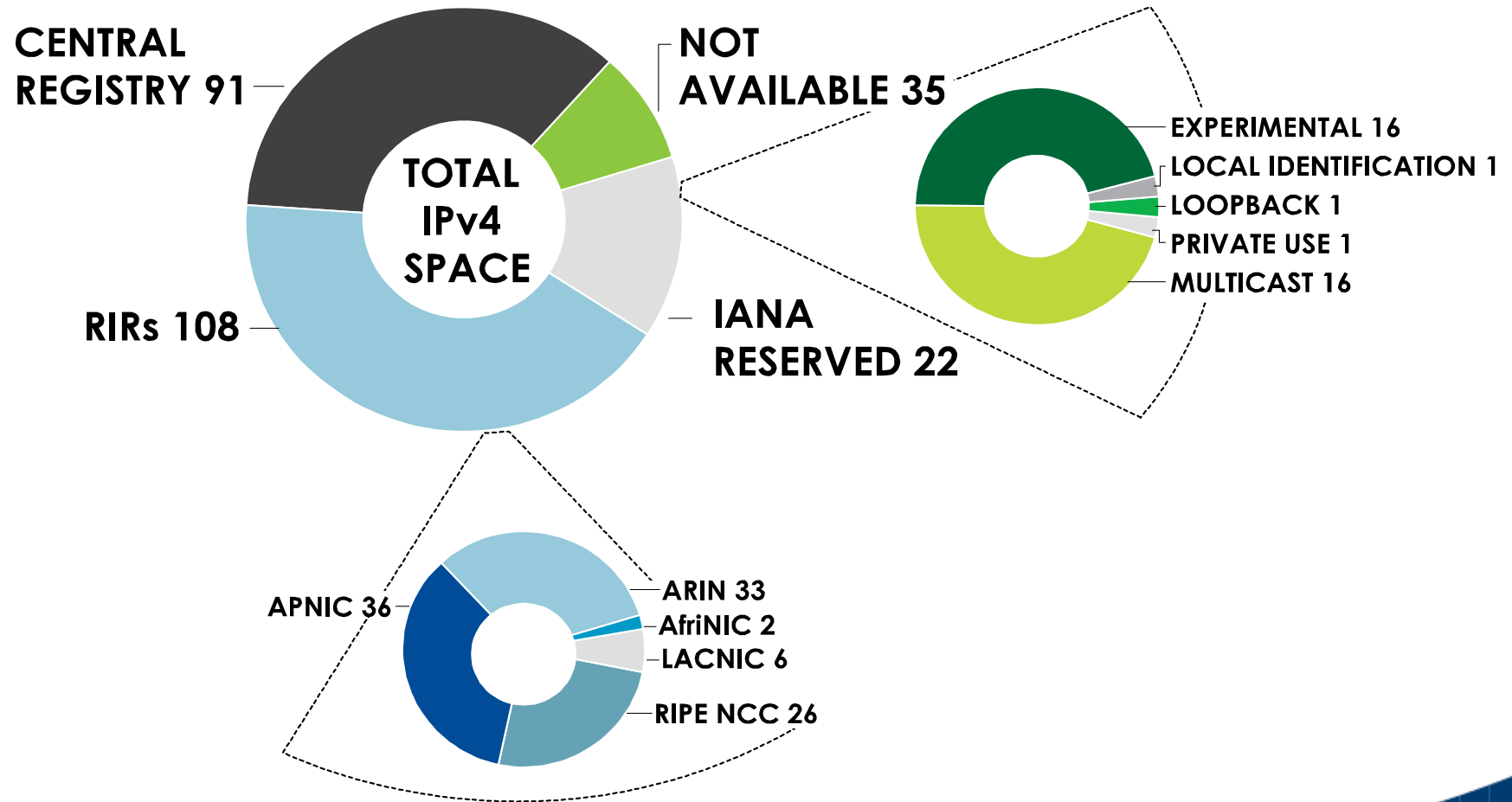
4-byte ASN Stats

- **In 2009**
 - Received 197 requests for 4-byte ASNs
 - 140 changed request to 2-byte
 - ARIN issued 27 4-byte ASNs in total
 - 15 orgs exchanged them for 2-byte ASNs
 - Total 4-byte ASNs issued in 2009 = 12
- **Typical reason for exchange:**

“Upstream said their router wouldn’t support 4-byte ASN”

IPv4 ADDRESS SPACE

What is the status of each of the 256 /8s?





<https://www.arin.net/participate/meetings/ARIN-XXV/>



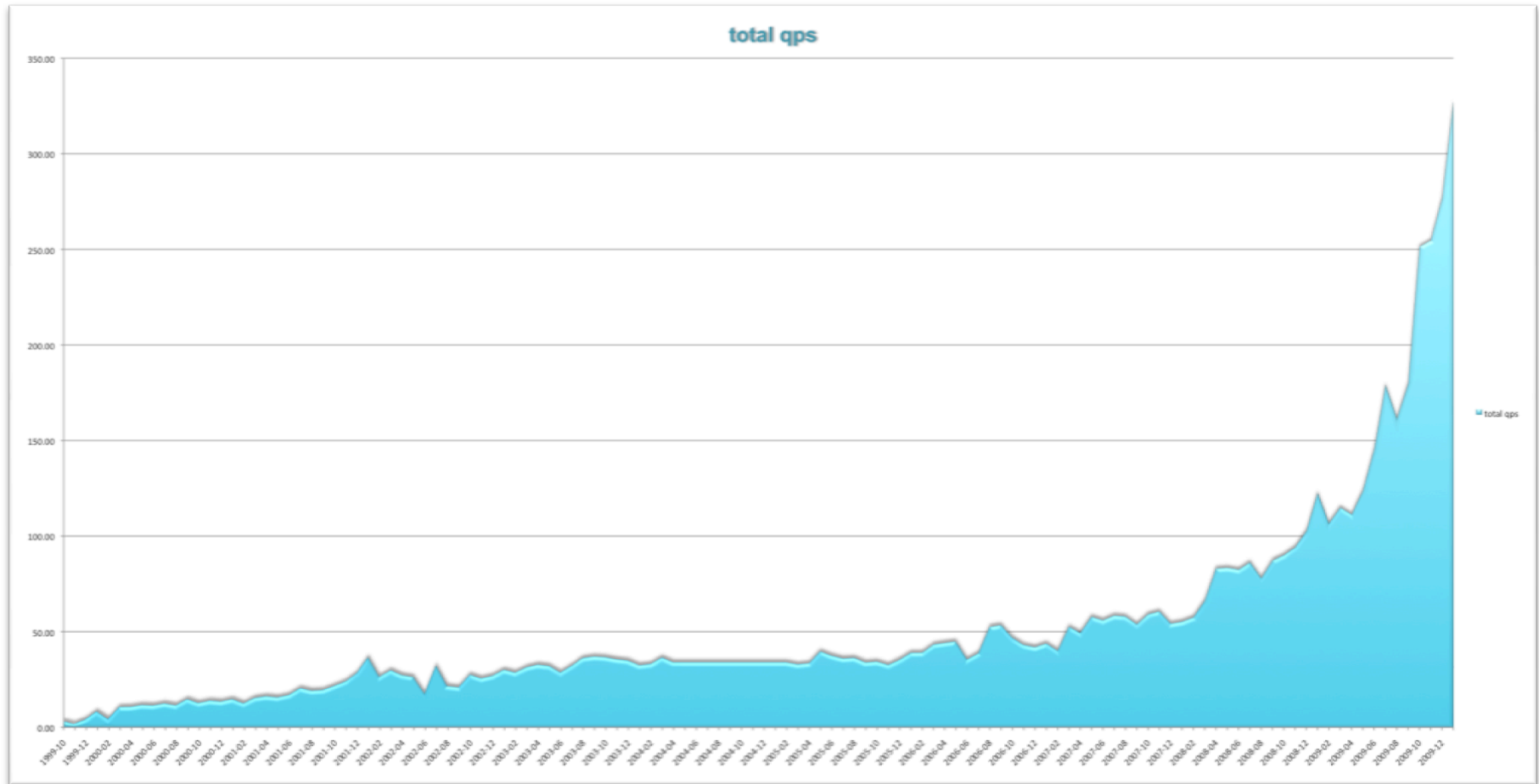
Application deadline: 26 Feb 2010



Public-Facing Development Efforts

- **ARIN Online**
- **DNSSEC**
 - Signing zones now
 - Interfaces to allow you to insert DS records in rolled out in 2010
- **RPKI**
 - Will be a production service at the end of 2010
 - Pilot available at <http://rpki-pilot.arin.net>
- **Whois-RWS**
 - Will be a production service in 2010
 - Pilot available at <http://whoisrws-demo.arin.net>

WHOIS Traffic



Whois Traffic Loads

- Over 50% of the queries are self-referential
 - 192.168.2.5 asking for 192.168.2.5
 - Most are singleton queries
 - Increasing over the last year
- Does not appear to be a botnet
- Most seem to be windows boxes
- Any ideas on what code is causing this?

What to do with Whois

- The WHOIS protocol has been deprecated by the IETF.
- Whois service is creaky – many problems with existing design – query and display formats, etc.
- It is time for a new look.
- Whois-RWS – A RESTful Web Service

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.
 - Reuses ARIN Online components
- Offers 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
- Uses HTTP infrastructure (e.g. caches)

Where can more information on REST be found?



- *RESTful Web Services*
 - O'Reilly Media
 - Leonard Richardson
 - Sam Ruby

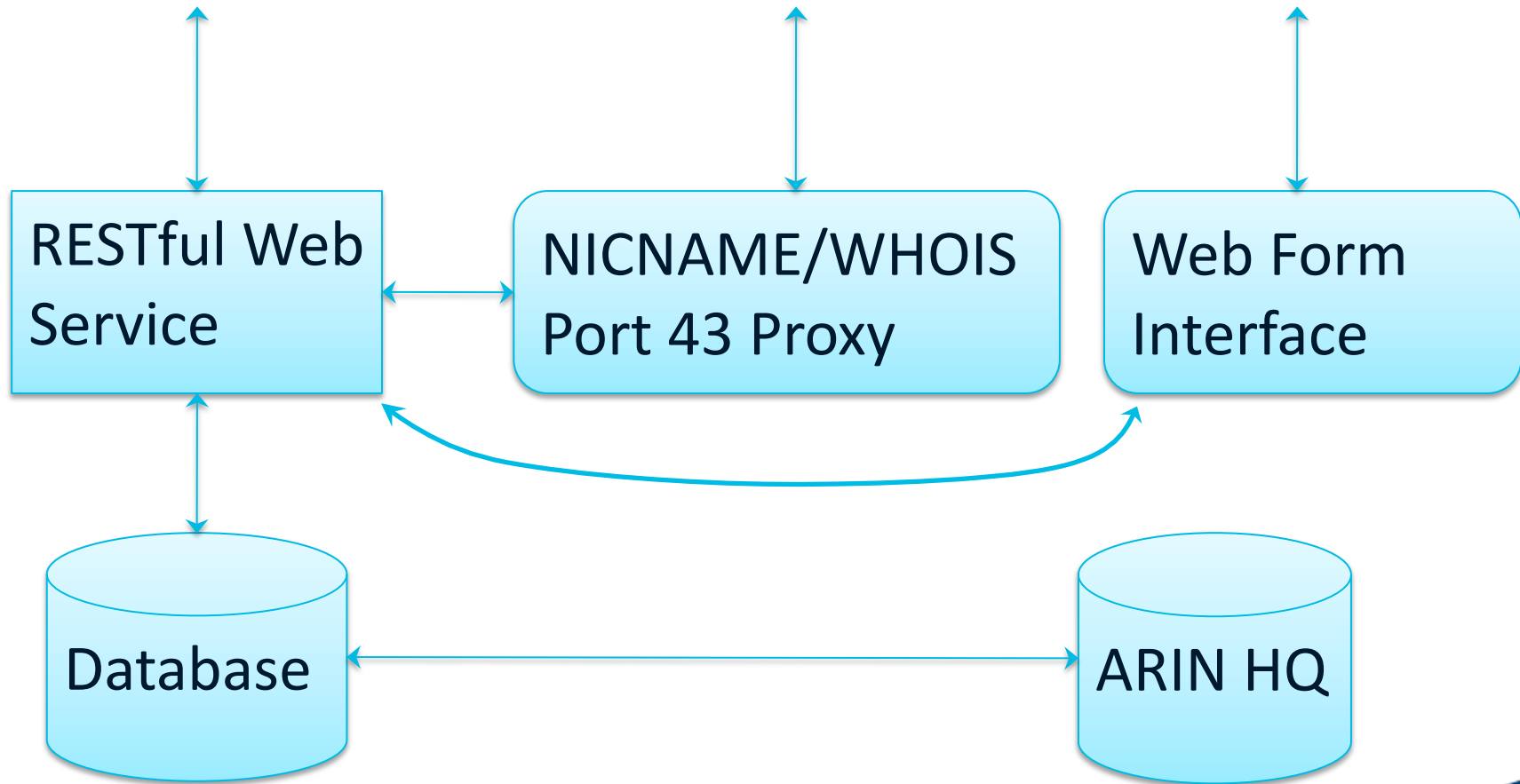
*When will the Whois-RWS
demo be available?*

Now.

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

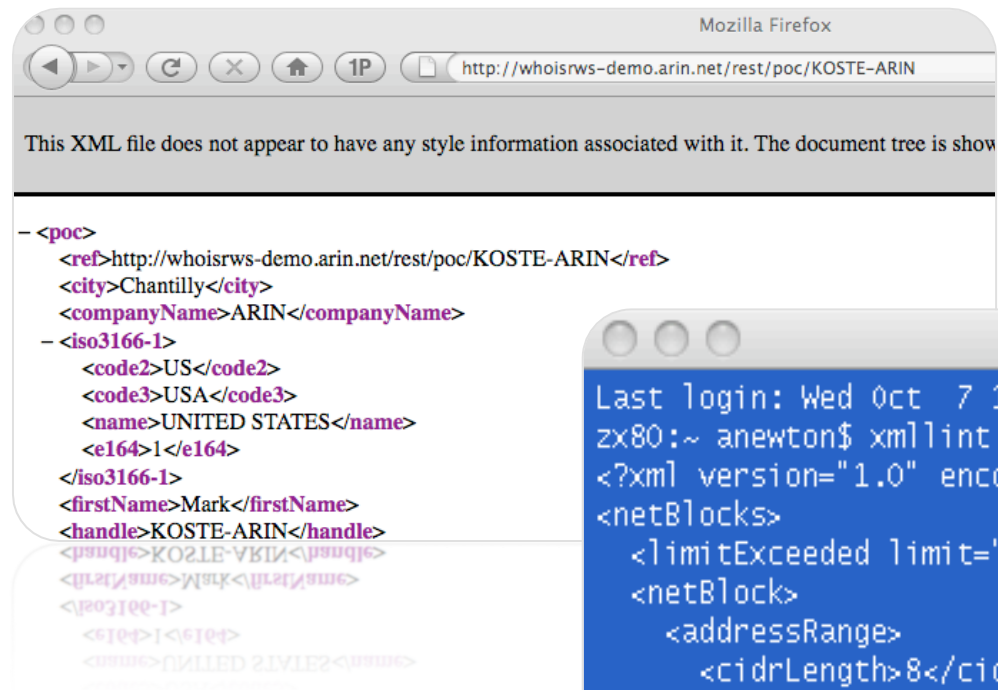
<http://whoisrws-demo.arin.net>

The Parts of the Service



* No clients written by ARIN

You Already Have Clients

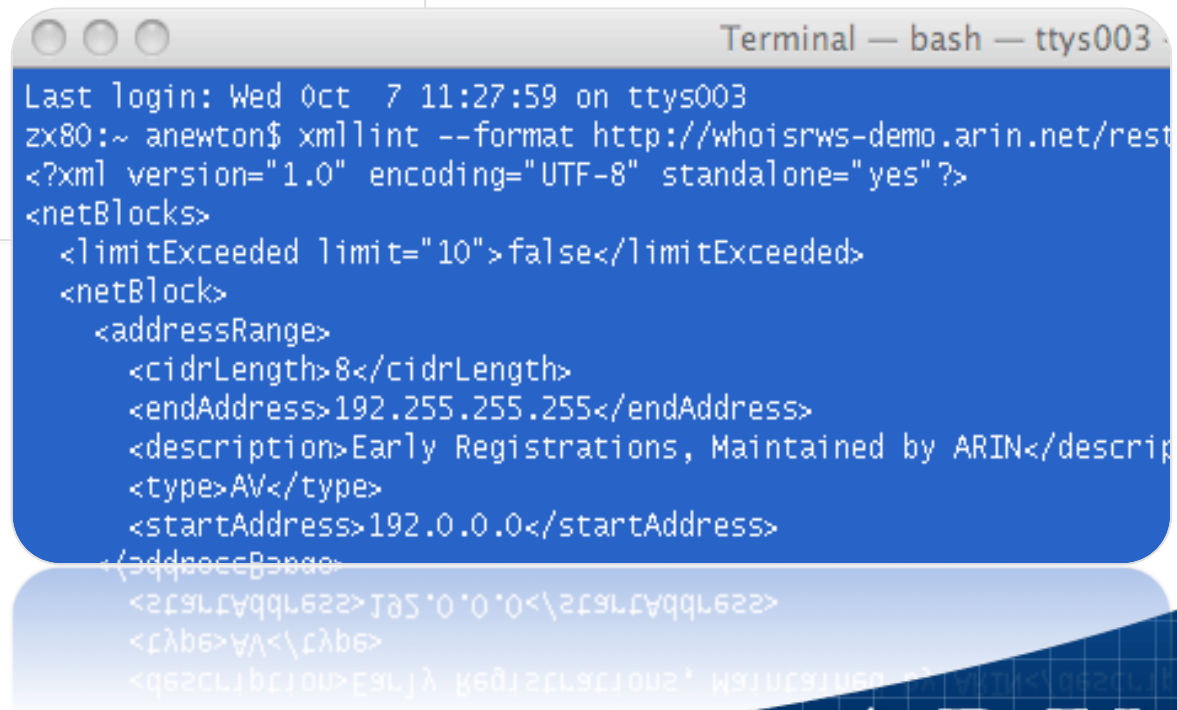


Mozilla Firefox

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

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

```
- <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>
<handle>KOSTE-ARIN</handle>
<name>Mark</name>
<id>1</id>
<e164>1</e164>
<name>UNITED STATES</name>
```



Terminal — bash — ttys003

```
Last login: Wed Oct 7 11:27:59 on ttys003
zx80:~ anewton$ xmlint --format http://whoisrws-demo.arin.net/rest/
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<netBlocks>
  <limitExceeded limit="10">false</limitExceeded>
  <netBlock>
    <addressRange>
      <cidrLength>8</cidrLength>
      <endAddress>192.255.255.255</endAddress>
      <description>Early Registrations, Maintained by ARIN</description>
      <type>AV</type>
      <startAddress>192.0.0.0</startAddress>
    </addressRange>
    <cidrLength>8</cidrLength>
    <endAddress>192.0.0.0</endAddress>
    <type>AV</type>
    <description>Early Registrations, Maintained by ARIN</description>
```

Web Browsers

- Modern web browsers will do XSL transforms.
- Firefox will show formatted XML.
- 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.
- It is 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/192.149.252.254>

- CIDR queries
 - Also available via port 43

<http://whoisrws-demo.arin.net/rest/cidr/192.149.252.0/24>

- Relative CIDR queries

<http://whoisrws-demo.arin.net/rest/cidr/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/legacy/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

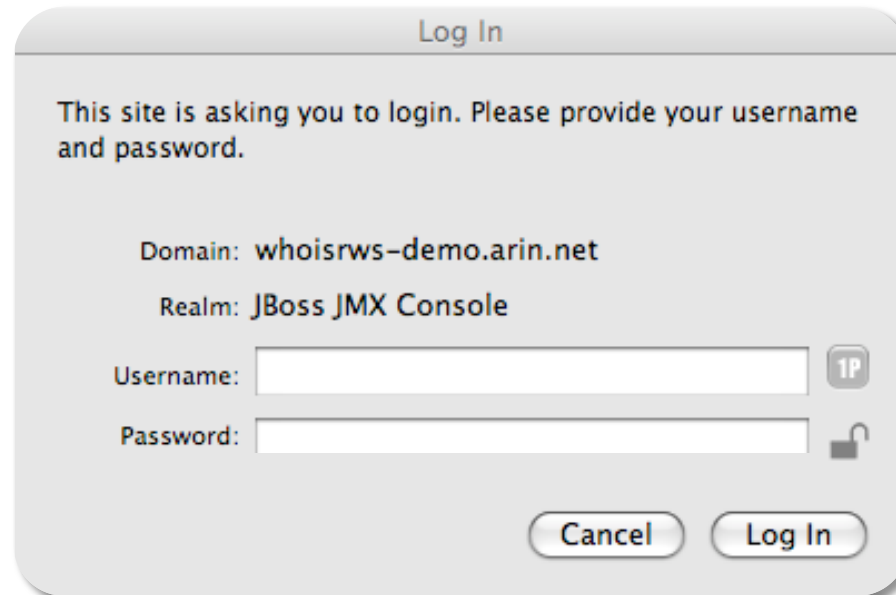
NetName: ARIN-2610
NetHandle: NET6-2610-1
NetType: Allocated to Big Network Provider
RegDate: 2005-11-17
Updated: 2009-09-14
CIDR: 2620::/23
Ref: <http://arin.net/rest/net/NET6-2610-1>
HolderRef: <http://example.com/rest/net/NET6-2610-1>

- 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

Realm: JBoss JMX Console

Username:

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.
 - Changes the 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

- You 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

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

Come to the microphone now.

Or join the mailing list:

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