Engineering Report
Mark Kosters
Big changes with Engineering

• Lots of requests for development/operations support
• The Board heard you
• Engineering growing by 12.5 FTEs
  – 5 operations
  – 3 developers
  – 4 SI
  – ½ PM
Staffing

• Operations
  – Seven engineers + two managers (0)
  – Five slots open
• Development
  – Ten engineers + manager (+2)
  – One slot open
• Software Integration
  – Nine engineers + manager (+4)
  – One slot open
• Project Management
  – One PM
  – One part-time slot open
• CTO
  – One
Accomplishments since ARIN 34

• Pre-approval support added in ARIN Online
• Transfers
  – 8.3 Released
  – 8.2 and 8.4 are underway
• Various improvements to STLS in ARIN Online
• Upgraded PGP to support RFC 3156
  – All POC validation messages are PGP-signed from hostmaster
• Improved membership support added in ARIN Online
• Moved ARIN Online and mail from ARIN HQ to colo
• Migration of NetApp from EMC SAN completed
Accomplishments Cont…

- Fault tolerance improvements
  - Redundancy/failover for internal network
- Corporate help desk and IT support
- ARIN member meeting support
- Care and feeding of servers & network
- OT&E
OT&E

• Operational Test & Evaluation
  – Place to test code
  – Place to test process
  – All services now under ote.arin.net
  – Was used in the RPKI demo on Sunday
  – Need to register to participate: ~161 networks have access today
    – [https://www.arin.net/resources/ote.html](https://www.arin.net/resources/ote.html)

• Core services in OT&E
  – Reg-RWS (provisioning API)
  – Whois-RWS (directory API)
  – Web interface
  – RPKI suite (up/down and hosted)
  – Soon - RDAP
YTD Efforts Cont…

• IETF Participation
  – SIDR (RPKI), WEIRDS (RDAP)

• ICANN Participation
  – SSAC
  – RSSAC
  – Technical Advisory Group
Operational Concerns

- Much quieter period than last report
- ISP Availability
  - Connectivity outages with ARIN HQ
    - Improved visibility on planned outages with Cox Management
    - Adding 2nd vendor – fiber now “close” to facility
  - Issues with west coast PFS site
    - RFP issued for a new vendor
    - Good set of responses so far
Operational Highlights

• 100% uptime on our public-facing sites over the past 6 years

• Services include
  – Whois
  – Whois-RWS
  – DNS
  – Mailing lists
  – FTP

• Will do the same with RPKI
ARIN Online Usage

- 96,512 accounts activated since inception through Q1 of 2015

Number of Accounts Activated

<table>
<thead>
<tr>
<th>Year</th>
<th>5000</th>
<th>10000</th>
<th>15000</th>
<th>20000</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Through Q1 of 2015
Active Usage of ARIN Online

• Logins from inception through Q1 of 2015

Logins

<table>
<thead>
<tr>
<th>Times logged in</th>
<th># of Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>&gt;50000</td>
</tr>
<tr>
<td>2 - 5</td>
<td>20000</td>
</tr>
<tr>
<td>6 - 10</td>
<td>10000</td>
</tr>
<tr>
<td>11 - 15</td>
<td>5000</td>
</tr>
<tr>
<td>&gt;16</td>
<td>1000</td>
</tr>
</tbody>
</table>
Reg-RWS Transactions (cumulative)

<table>
<thead>
<tr>
<th></th>
<th>ARIN 29</th>
<th>ARIN 30</th>
<th>ARIN 31</th>
<th>ARIN 32</th>
<th>ARIN 33</th>
<th>ARIN 34</th>
<th>ARIN 35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Template</td>
<td>408,383</td>
<td>595,858</td>
<td>846,943</td>
<td>1,066,037</td>
<td>1,311,403</td>
<td>1,498,204</td>
<td>1,749,383</td>
</tr>
<tr>
<td>REST</td>
<td>40,374</td>
<td>320,197</td>
<td>841,105</td>
<td>3,524,124</td>
<td>4,296,734</td>
<td>4,715,231</td>
<td>5,034,717</td>
</tr>
</tbody>
</table>
## DNSSEC

<table>
<thead>
<tr>
<th></th>
<th><strong>ARIN 35</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>DNSSEC Secured Zones</td>
<td>512</td>
</tr>
<tr>
<td>Number of Orgs with DNSSEC</td>
<td>107</td>
</tr>
<tr>
<td>Total Number of Delegations</td>
<td>569,917</td>
</tr>
</tbody>
</table>
# RPKI Usage

<table>
<thead>
<tr>
<th></th>
<th>ARIN XXX</th>
<th>ARIN XXXI</th>
<th>ARIN XXXII</th>
<th>ARIN33</th>
<th>ARIN34</th>
<th>ARIN 35</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPAs Signed</td>
<td>27</td>
<td>72</td>
<td>130</td>
<td>162</td>
<td>208</td>
<td>289</td>
</tr>
<tr>
<td>Certified Orgs</td>
<td>47</td>
<td>68</td>
<td>108</td>
<td>153</td>
<td>187</td>
<td></td>
</tr>
<tr>
<td>ROAs</td>
<td>19</td>
<td>60</td>
<td>106</td>
<td>162</td>
<td>239</td>
<td>308</td>
</tr>
<tr>
<td>Covered Resources</td>
<td>30</td>
<td>82</td>
<td>147</td>
<td>258</td>
<td>332</td>
<td>430</td>
</tr>
<tr>
<td>Up/Down Delegated</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Whois Queries Per Second

![Graph showing Whois Queries Per Second over time with two lines representing RESTful and Port 43. The graph has a y-axis from 0 to 4000 and an x-axis from 2001-07 to 2015-03. The line for RESTful starts at a low level and increases significantly in 2010-07, while the line for Port 43 remains relatively stable.]
Whois via IPv6

Percentage of traffic over IPv6

![Graph showing the percentage of traffic over IPv6 from 2009-01 to 2015-01. The graph indicates a steady increase in the percentage of traffic over IPv6, with a significant spike in 2014-04 to 2015-01.]
IRR Maintainers

<table>
<thead>
<tr>
<th>Year</th>
<th>Maintainers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>1726</td>
</tr>
<tr>
<td>2012</td>
<td>1850</td>
</tr>
<tr>
<td>2013</td>
<td>1951</td>
</tr>
<tr>
<td>2014</td>
<td>2102</td>
</tr>
<tr>
<td>2015</td>
<td>2203</td>
</tr>
<tr>
<td></td>
<td>2011</td>
</tr>
<tr>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Route</td>
<td>18636</td>
</tr>
<tr>
<td>Route6</td>
<td>242</td>
</tr>
</tbody>
</table>
IRR InetNum / Inet6Num

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>InetNum</td>
<td>419</td>
<td>481</td>
<td>531</td>
<td>621</td>
<td>661</td>
</tr>
<tr>
<td>Inet6Num</td>
<td>13</td>
<td>25</td>
<td>38</td>
<td>51</td>
<td>63</td>
</tr>
</tbody>
</table>
Systems at the forefront

• **RPKI**
  – Up/Down available – two takers so far – one removed themself
  – **One side effect of Up/Down so far**
    • Validator reporting needs to be fixed
    • If a delegated repository goes down, it looks like the whole RIR goes bad

• **RDAP (IETF WEIRDS)**
  – Became a set of RFCs during IETF 92
  – Code written and being tested – will be deployed in Q3 at the latest
  – ARIN has open source software at [http://projects.arin.net](http://projects.arin.net)
  – Other RIRs and Domain registries are also deploying RDAP
Systems (cont..)

• Creating APIs to core services
  – Allows YOU to create tools
  – Allows YOU to follow your timeline

• projects.arin.net (ACSP completed years ago)
  – If you find your tool is cool … publish it on our site
  – Way to allow others to come find and use it
  – We had two takers so far since ARIN 33 with new tools
    • Whois-stats - Daily Whois Statistics Parser for JSON.
    • ArinWhois.net - A .NET client for ARIN's Whois-RWS.
What we are working on through 2015 Q3

- Further automation on transfers
- Add Links to Whois Query Responses (ACSP 2011.29)
- Change Whois Output for Certain /8 Records (ACSP 2013.4)
- Two-Factor Authentication (ACSP 2013.8)
- Moving RDAP pilot into production
- Start “SWIP Easy” – a web-based tool to send in reassignment information
- Work on various other ACSPs
- Multiple transit links per Public Facing Site (PFS) with DDoS mitigation
- New load balancers for https support
- New west coast PFS site
- Security audit
- Technical backlog (example: moving from Java6 to Java8)
Comments?