Engineering Update

Mark Kosters, CTO

Staffing Summary

- **Operations**
  - Five engineers + manager

- **Information Systems and Security**
  - Three engineers + manager

- **Development**
  - Nine engineers + manager
  - User Experience Expert
  - User Interface Designer

- **Software Integration**
  - Five engineers + manager

- **Project Management**
  - One project manager and one part-time project manager

- **CTO**

Accomplishments since ARIN 42

- Main focus areas
  - Website Improvements
    - ARIN Online is now 100% on Angular technology
    - Outstanding area which is not:
      - Whois web search (whois.arin.net)
  - Technical Debt
  - Whois performance
    - Yes, still have instances of crawling a /32 at a time
    - Lots of traffic from
      - Specific countries
      - Social network providers
      - Cloud providers

Accomplishments since ARIN 42

- ACSPs
  - ACSP 2011.21 – ARIN Online User Interface
  - ACSP 2016.2 - Minor UI Improvements to ARIN Online
  - ACSP 2016.3 – Provide Web UI for RDAP

- Completed Version 1 of User Interface (UI) work incrementally placed in ARIN Online
  - Lots of iteration to be done
  - CMSD continues with content responsibility

- RDAP conformance
  - Added network type field (type) to the IP Response object for RDAP.
  - Added network status array (status) to the IP Response object for RDAP.
  - To satisfy RFC 7480 requirements, ARIN's RDAP service now allows application/json as an Accept header, in addition to application/rdap+json

A Few Words about the New Website

- Website has had a lot of your input
  - Test drives
  - User feedback

- Website has been extensively overhauled
  - Every dynamic page reviewed by the UI/UX team
  - Every dynamic page has new technology behind it

- Engineering created a new framework for static content

- Site is now responsive

- Site was designed and tested to meet [Web Content Accessibility Guidelines 2.1](), level AA compliance

- The new site is a culmination of a multi-year cross-department collaboration

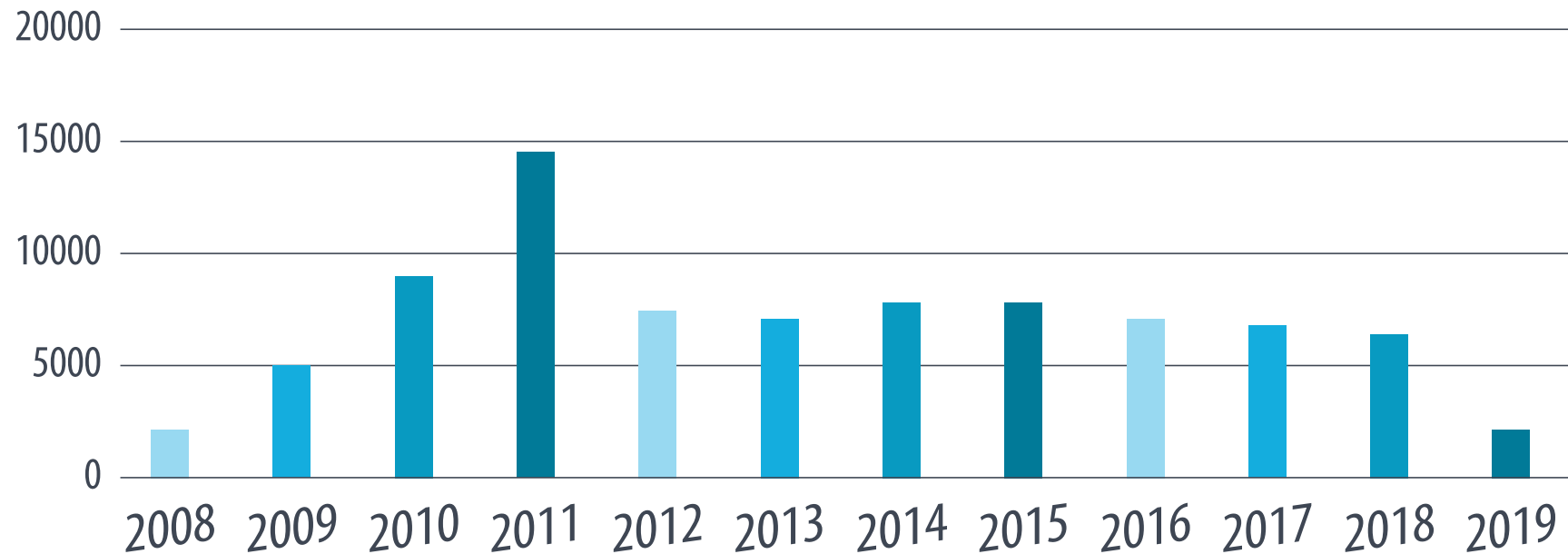# Accomplishments since ARIN 42

- Technical Debt Completed
  - Upgraded DNS monitoring
    - Sadly it took an DNSSEC outage to shore up identified shortcomings
    - Still behind on our bump in the middle DNSSEC signer
  - Automated build systems using Ansible
  - Modernized our virtualization managers
- More whois performance improvements

ARIN Online Usage

149,335 accounts activated since inception through Q1 of 2019
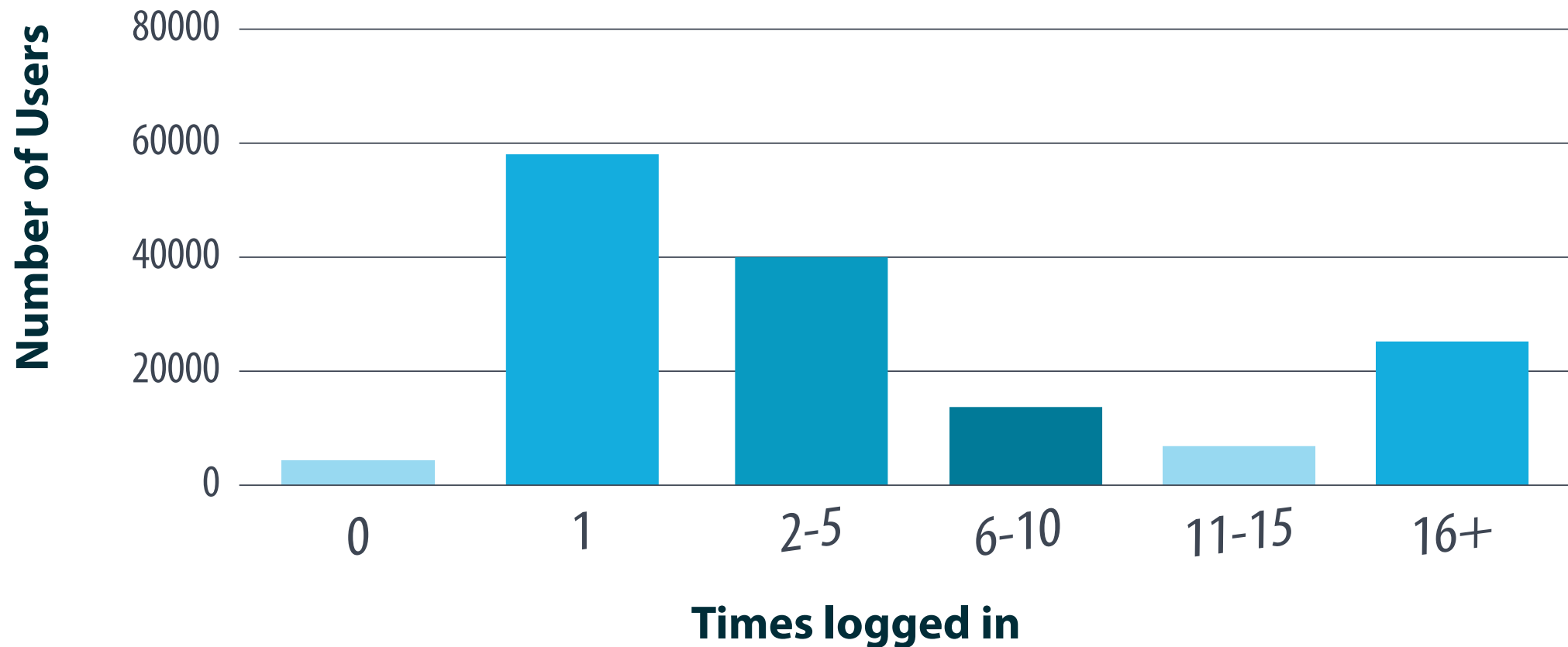

Number of Accounts Activated
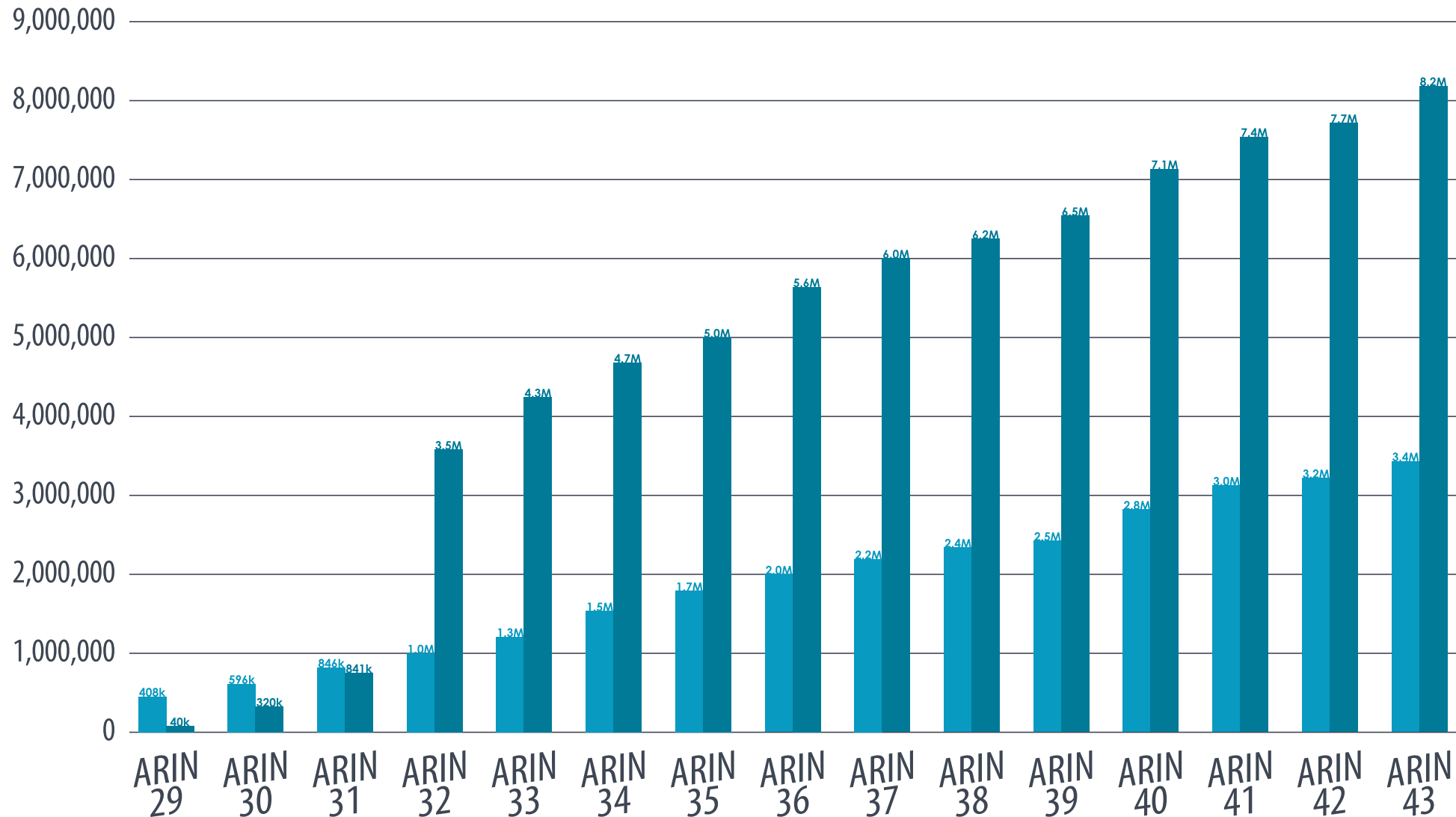
* Through Q1 of 2019

Active Usage of ARIN Online

Logins from inception through Q1 of 2019

Chart: Number of Users vs. Times logged in

Times logged in	Number of Users (approx.)
0	~4000
1	~58000
2-5	~40000
6-10	~13000
11-15	~6500
16+	~25000

Provisioning Transactions
(cumulative – RESTful + templates)

#ARIN43

DNSSEC

	ARIN 43
Number of Orgs with DNSSEC	184 (+11)
Total Number of Delegations	663,965
DNSSEC Secured Zones	1,210 (+222)
Percentage Secured	0.18 % (+.03%)

Resource Public Key Infrastructure (RPKI) Usage

	Oct 2012	Apr 2013	Oct 2013	Apr 2014	Oct 2014	Apr 2015	Oct 2015	Apr 2016	Oct 2016	Apr 2017	Oct 2017	Apr 2018	Sep 2018	Apr 2019
Certified Orgs		47	68	108	153	187	220	250	268	292	328	361	434	591
ROAs	19	60	106	162	239	308	338	370	414	470	538	604	1013	4519
Covered Resources	30	82	147	258	332	430	482	528	577	640	741	825	1953	5816
Up/Down Delegated		0	0	0	1	2	1	2	2	2	1	1	1	

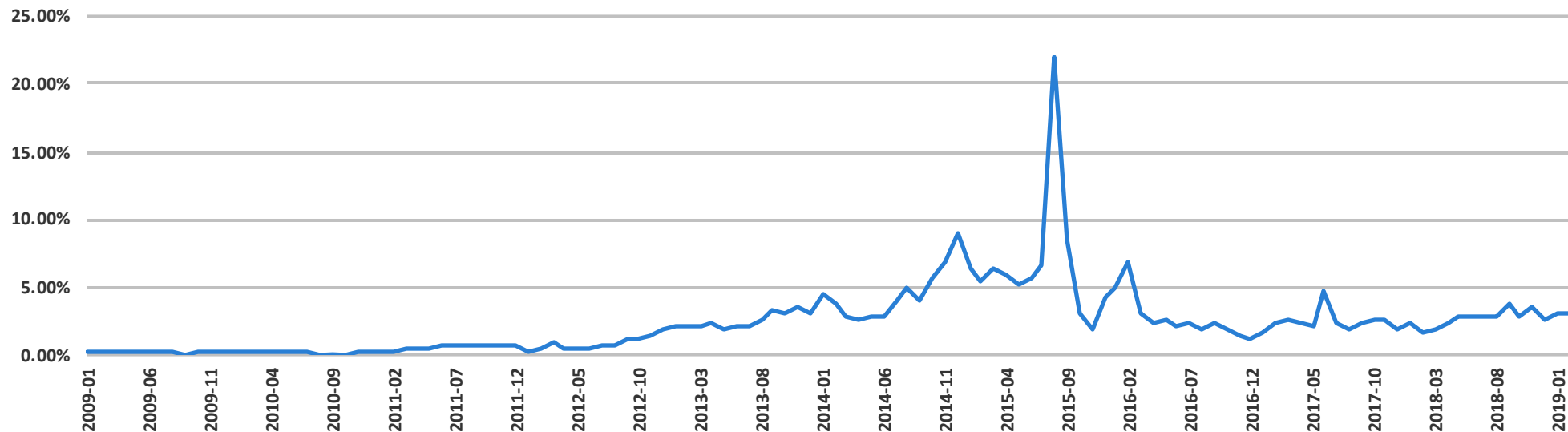# Whois/Whois-RWS Queries Per Second

Queries Per Second
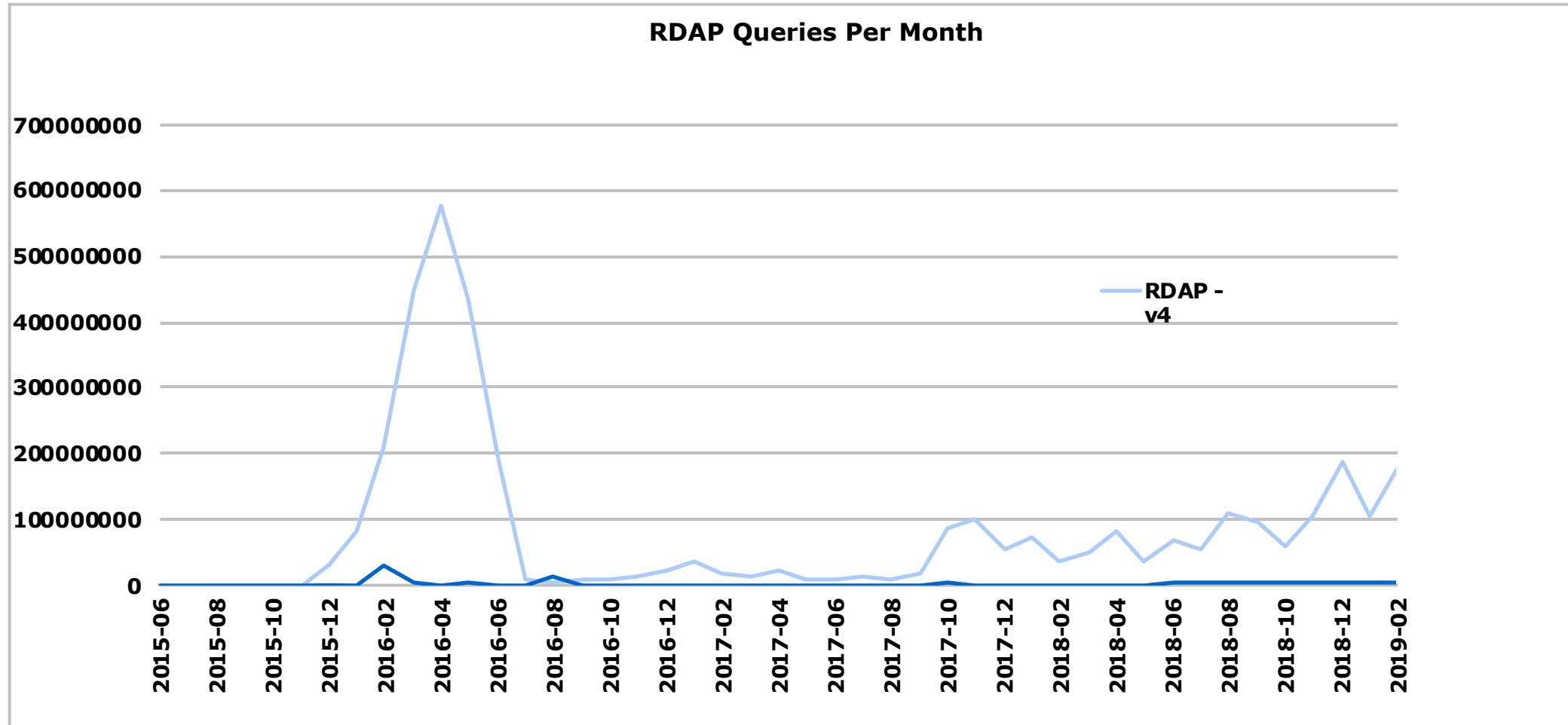
Whois RWS ——— Whois Port 43
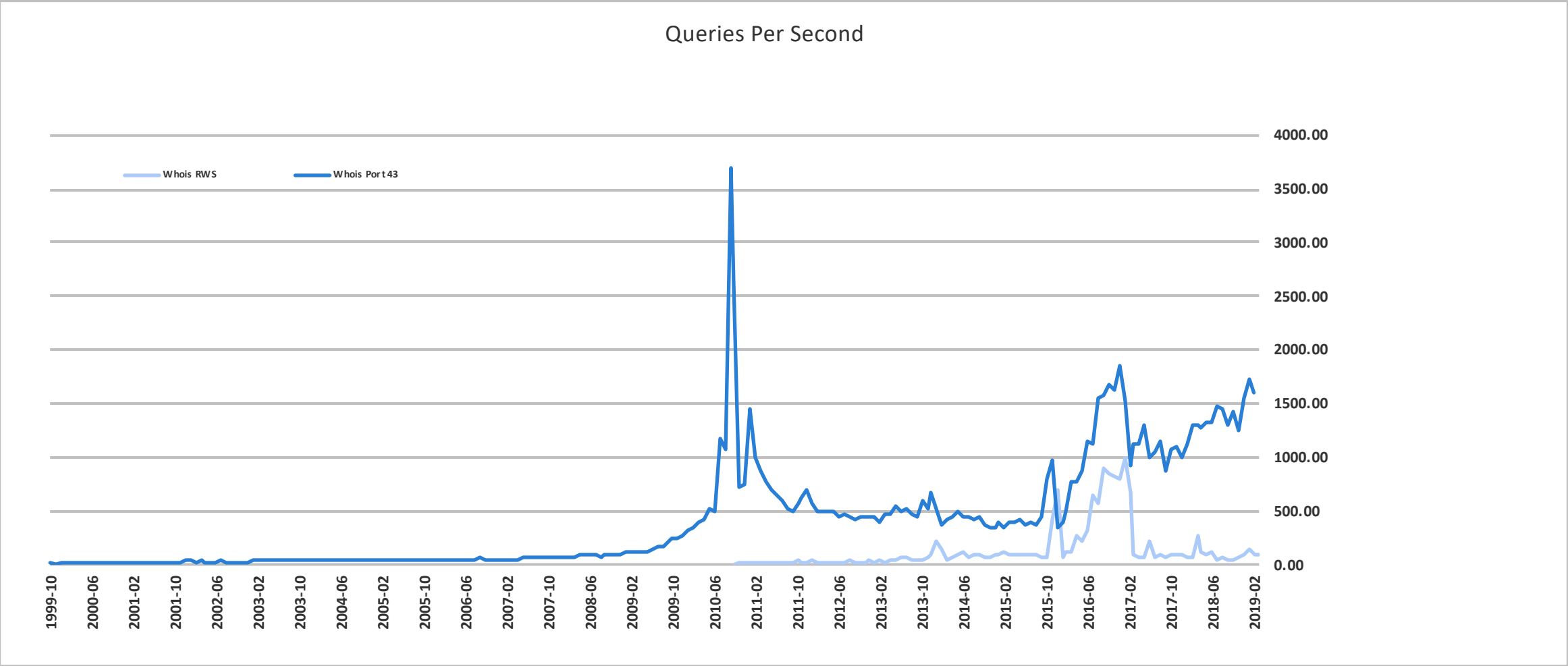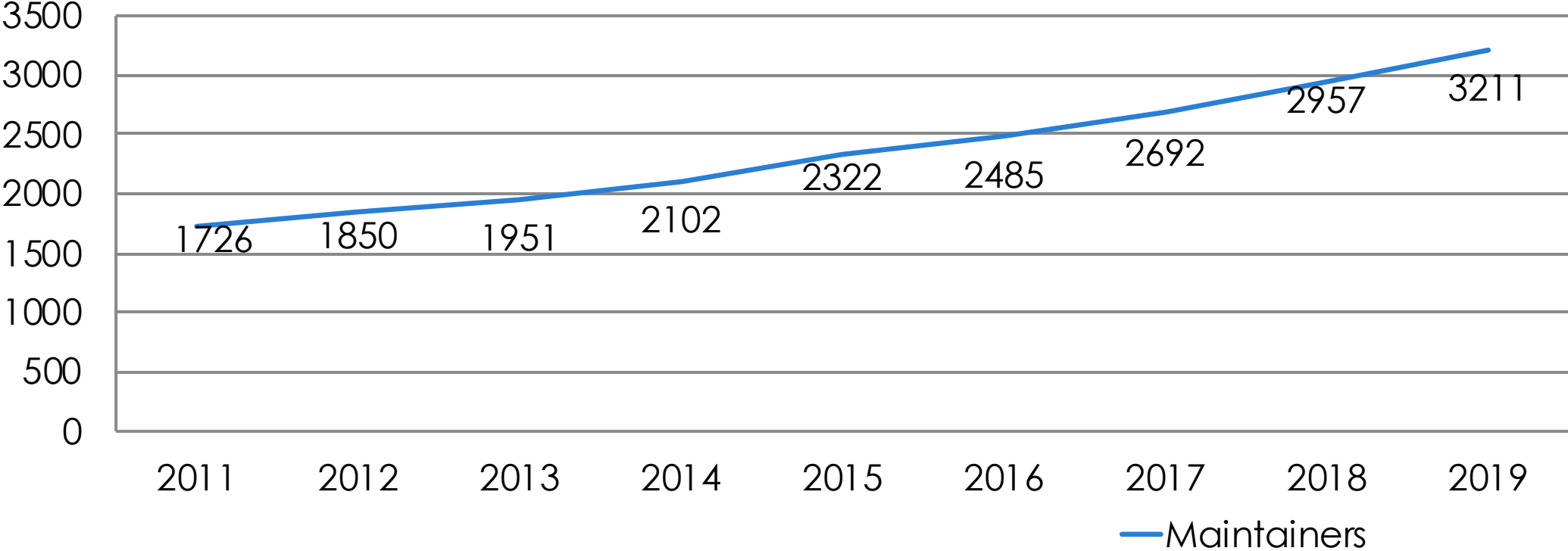
Whois/Whois-RWS/RDAP Queries over IPv6

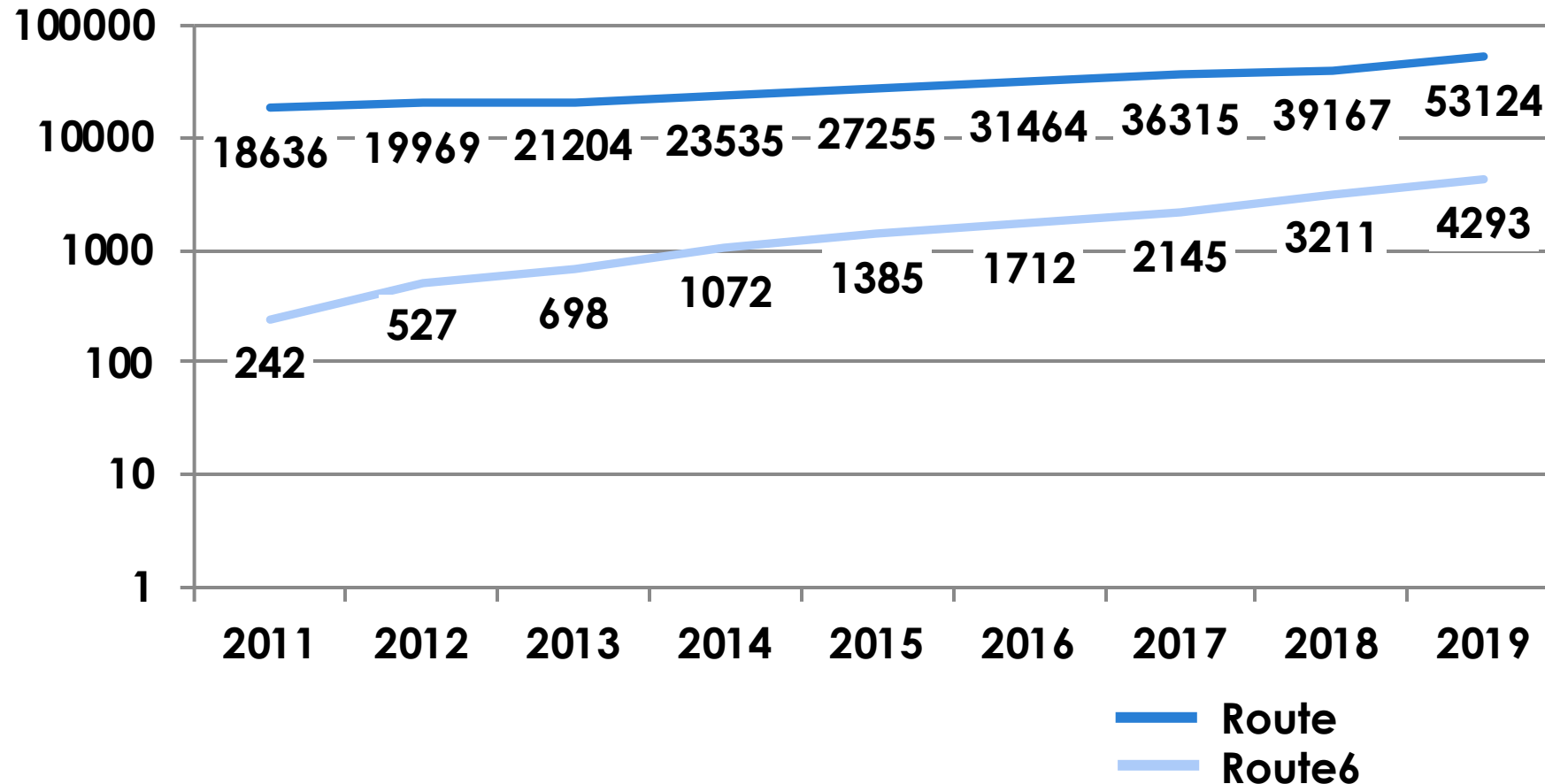Directory Service Queries over IPv6

Registry Data Access Protocol (RDAP)

Internet Routing Registry (IRR) Maintainers

2019 Data through Q1

IRR Route / Route6 Objects

2011: Route 18636, Route6 242
2012: Route 19969, Route6 527
2013: Route 21204, Route6 698
2014: Route 23535, Route6 1072
2015: Route 27255, Route6 1385
2016: Route 31464, Route6 1712
2017: Route 36315, Route6 2145
2018: Route 39167, Route6 3211
2019: Route 53124, Route6 4293
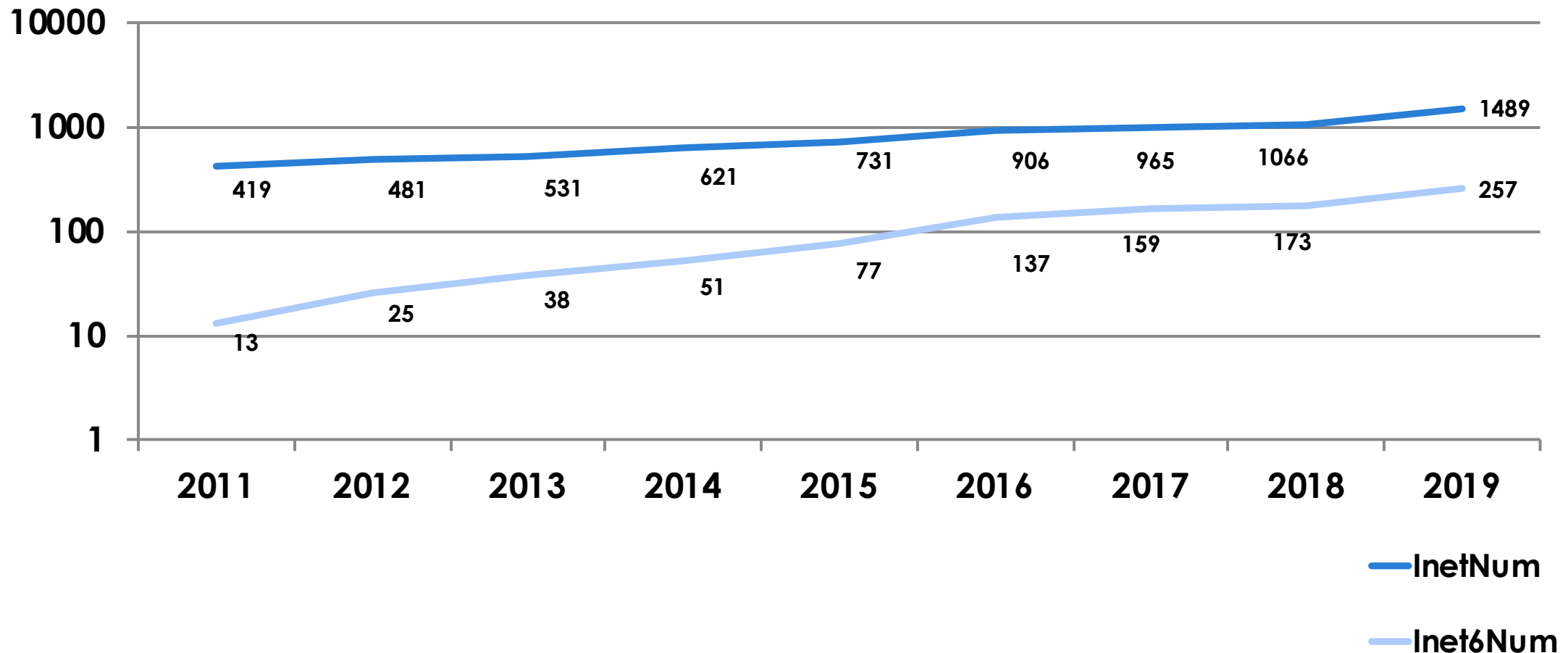
Route

Route6

2019 data through Q1

IRR InetNum / Inet6Num Objects

2019 data through Q1

IRR Object Breakout by Organization

Number of Organizations	Number of Objects
6	1001-19574
57	100-1000
5	90-99
5	80-89
12	70-79
19	60-69
17	50-59
569	10-49
731	5-9
1829	1-4

What we are working on through 2019 Q3

- IRR
  - In the design stages now
  - Will start development work in Q3 2019
- Stateless ARIN Online
  - No more pesky timeouts!
  - Allows engineering to deploy without an outage
- RPKI HSM Upgrade
- Website phase II
  - Website chat
  - Website ACSPs

What We are Working on Through 2019 Q3

- Technical backlog
  - Still on Java 7 and JBoss
  - Automated build systems using Ansible
    - Folding the remaining puppet iterations into Ansible
  - Upgrading bump-in-the-wire DNSSEC signer (holdover)
- Global Service Load Balancing for ARIN Services
  - Currently using Round-robin DNS
- Working on cutover to disaster site
  - Servers are there
  - Glue tying it together requires more work (monitoring/database connections/mail flow etc)

Coordination Work with the Other RIRs

- Working out differences on
    - Registration Data Access Protocol (RDAP) implementations
    - Extended statistics file formats

- Internet Technology Health Indicators (ITHI)
    - Working on coordinated reporting between the RIRs

- Resource Public Key Infrastructure (RPKI)
    - Providing operational feedback on various protocol enhancements within Internet Engineering Task Force (IETF)
    - Examples are:
        - RPKI Validation Reconsidered
        - RPKI signed object for Trust Anchor Locators (TALs)
        - RPKI Multiple "All Resources" Trust Anchors Applicability Statement

Thank you.

Any Questions?

Discussion