Routing Security and Services Update

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Agenda

IRR Update and Statistics

RPKI Update and Statistics

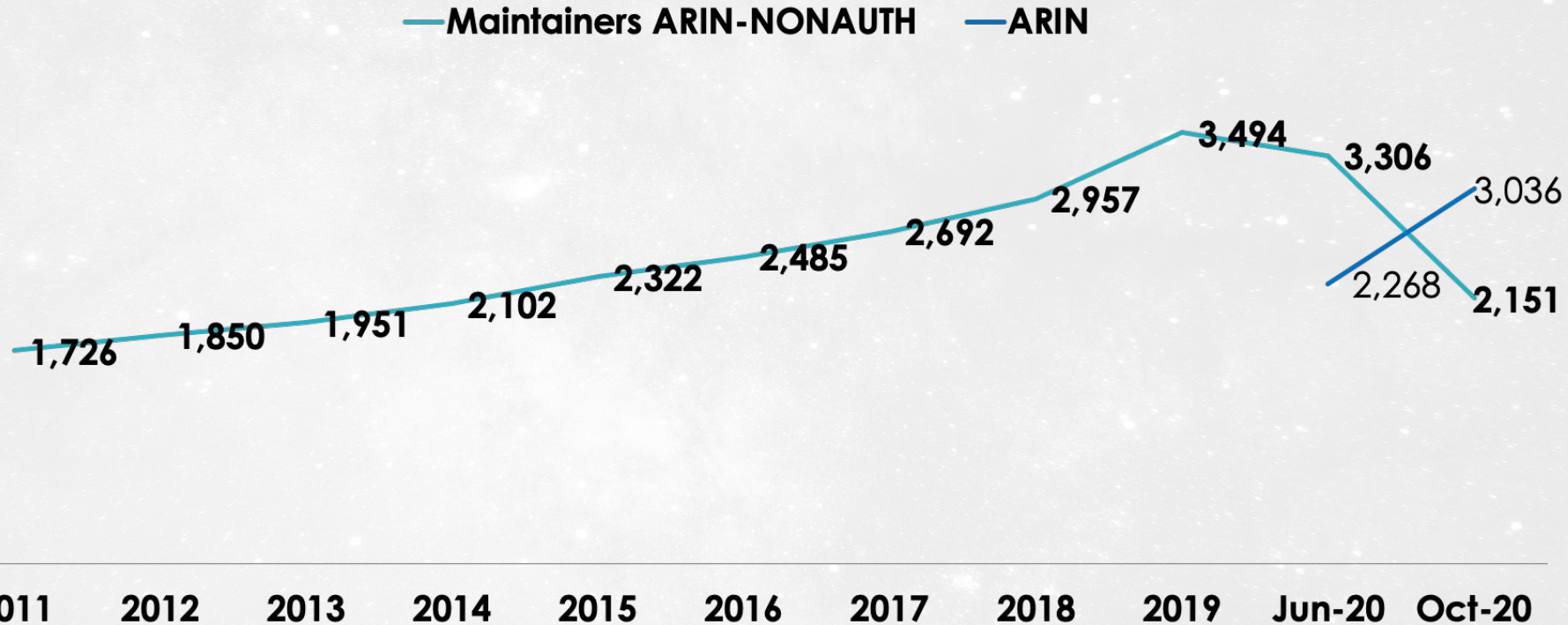Directory Service Statistics

IRR Statistics

- Rolled out a new IRR that lives beside the old IRR on June 10
- Two sources of Information
  - ARIN - Authenticated IRR objects
  - ARIN-NONAUTH -
    - Non-authenticated objects
    - Objects from Orgs that are not under contract (RSA/LRSA)
- Truly Authenticated against an Organization's resources
  - Only the network holder can create a route/route6 object using that network space
- ARIN NONAUTH still exists
  - Only maintainers can register objects
  - No longer will create new maintainers
  - No authentication of objects
- Incremental improvements deployed since June 10
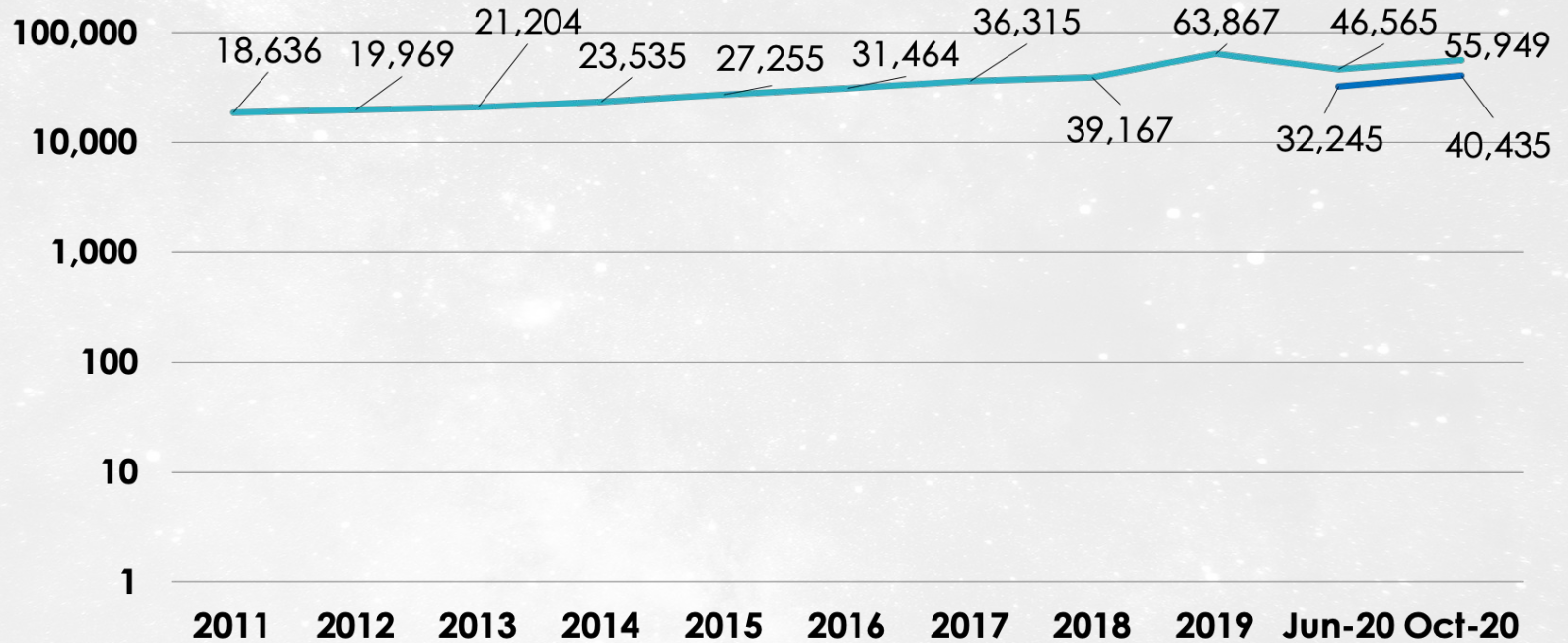
IRR Planned Updates

- Focus on backend systems integration with ARIN Staff actions
  - Transfers
  - Changes in the ARIN's registry are reflected in IRR
- Focus on a new RESTful API
  - Looking at other existing RESTful API's
  - IRR REST services will be integrated into the existing Reg-RWS system in Jan 2021

Internet Routing Registry (IRR) Maintainers

— Maintainers ARIN-NONAUTH — ARIN

2011	2012	2013	2014	2015	2016	2017	2018	2019	Jun-20	Oct-20
1,726	1,850	1,951	2,102	2,322	2,485	2,692	2,957	3,494	3,306	2,151
									2,268	3,036

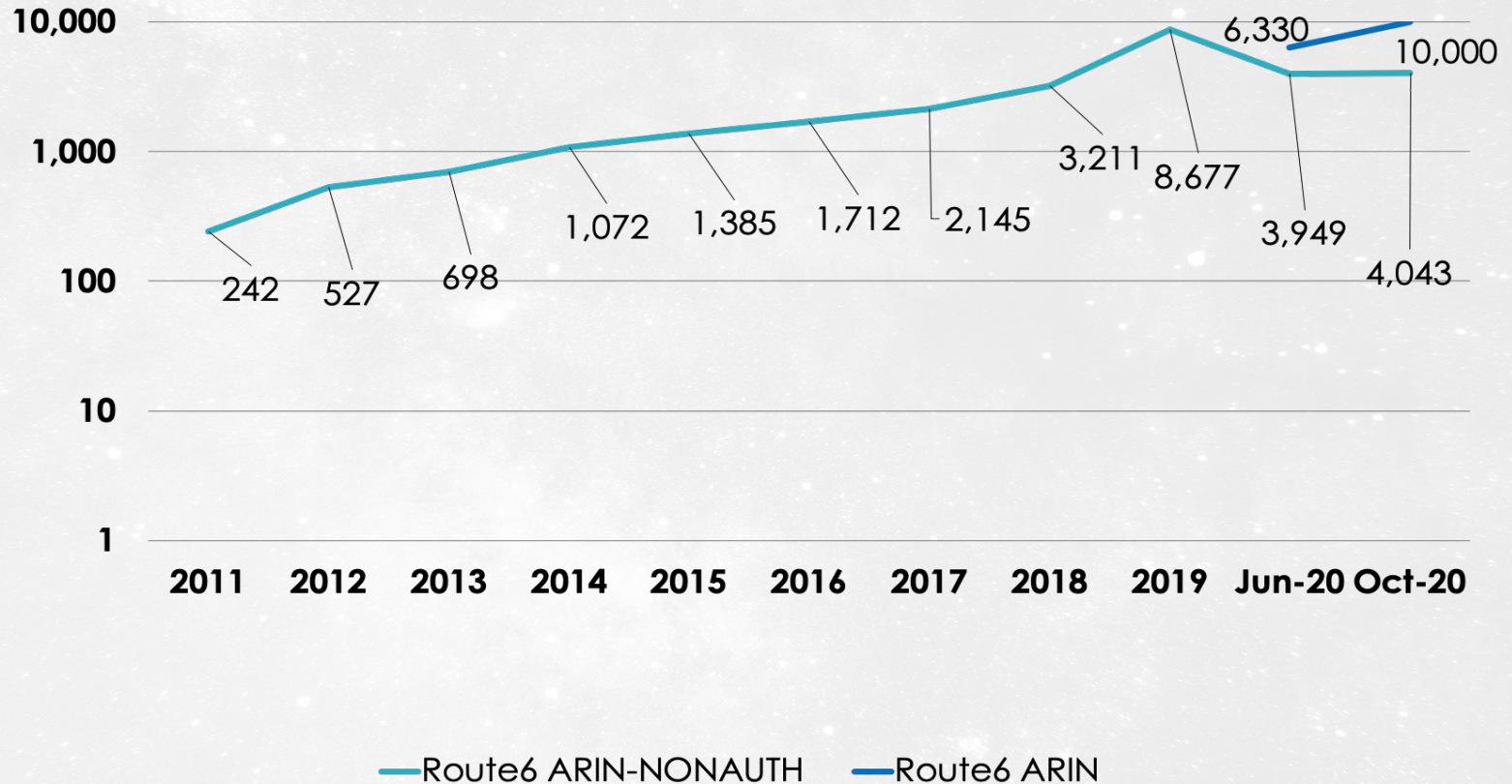# IRR Route Objects

IRR Route6 Objects

RPKI Statistics

- Rolled out new Hardware Security Modules (HSMs)
- IBM 4765 no longer supported - replaced with an IBM 4767
- Had to Import IBM 4767 from Canada (Fun!)
- Simplified the HSM interface and removed the architectural limits that caused restrictions in various areas
  - Restricted the number of ROAs that can be deleted at one time
  - Restricted the numbers of manifests
  - Still have limits but working on upping them over time
    - Contact Registration Services if you plan to have more than 20,000 ROAs deleted at one time
    - Right now, the highest number of ROA's held by a Org is 6,000 ROAs

RPKI Challenge

- Rollout was initially smooth on August 12, 2020
  - Tested code against both RIPE's Validator and NLnet Labs Routinator
  - When deployed, all tests and websites using those validators where green
  - Within an hour, we received validation error reports from those who use the Fort and OpenBSD rpki-client
  - OpenBSD and ARIN Engineering dissected the various encodings and found the error
  - Was fixed within 24 hours
- We discovered that many validators have different ways of interpreting the crypto objects
  - Significant discussion in the IETF on handling errors
  - No real conclusion on the best way forward within the IETF
- Lessons Learned
  - Test against two new validators beyond RIPE and NLnet Labs's validators
  - Have the list validators tested against on the ARIN website
 - Have monitoring expanded to include multiple validators

RPKI Statistics

	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	Sep 2019	May 2020	Sep 2020
Certified Orgs		47	68	108	153	187	220	250	268	292	328	361	434	591	793	1,125	1,418
ROAs	19	60	106	162	239	308	338	370	414	470	538	604	1,013	4,519	5,454	7,717	15,342
Covered Resources	30	82	147	258	332	430	482	528	577	640	741	825	1,953	5,816	7,514	11,109	19,939
Up/Down Delegated			0	0	0	1	2	1	2	2	2	1	1	1	1	8	9

Directory Services Challenge

- Ever greater amount of queries served up by our Directory Services Systems (Whois/Whois-RWS/RDAP)
- Much staff time is spent on these systems
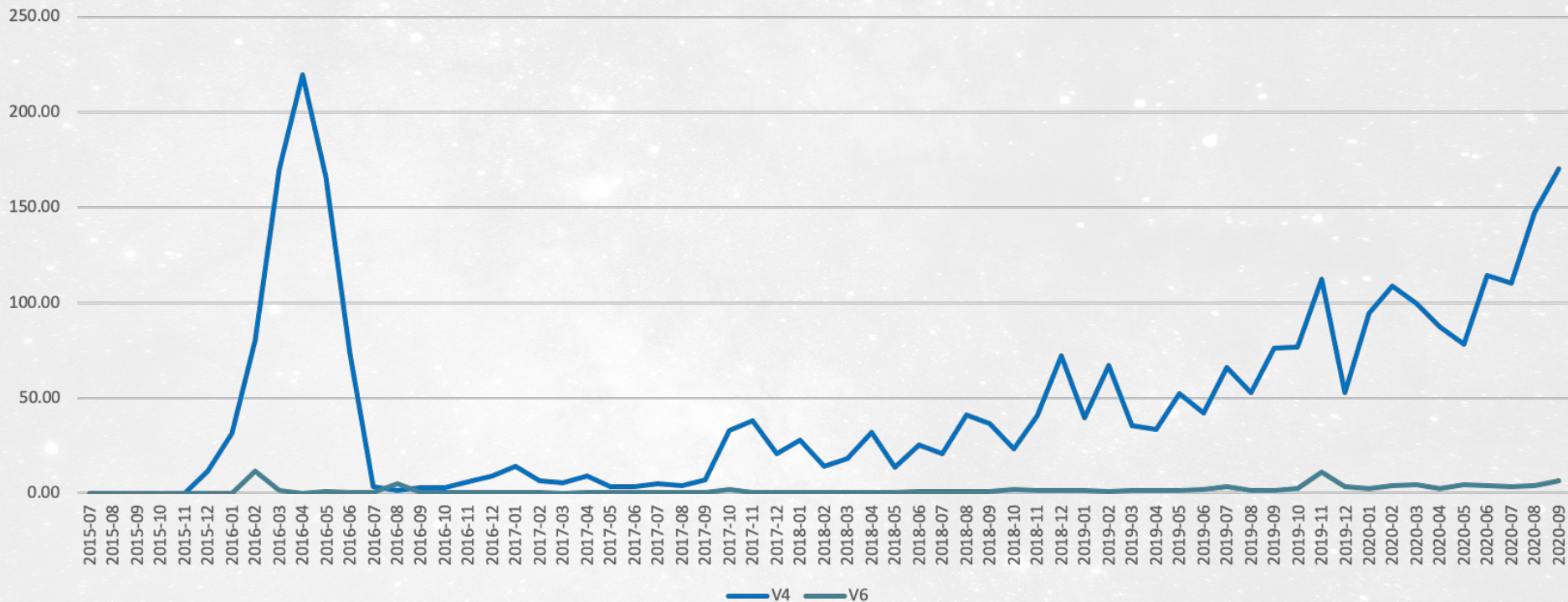- Largest use of our resources

Whois/Whois-RWS Statistics

Queries Per Second
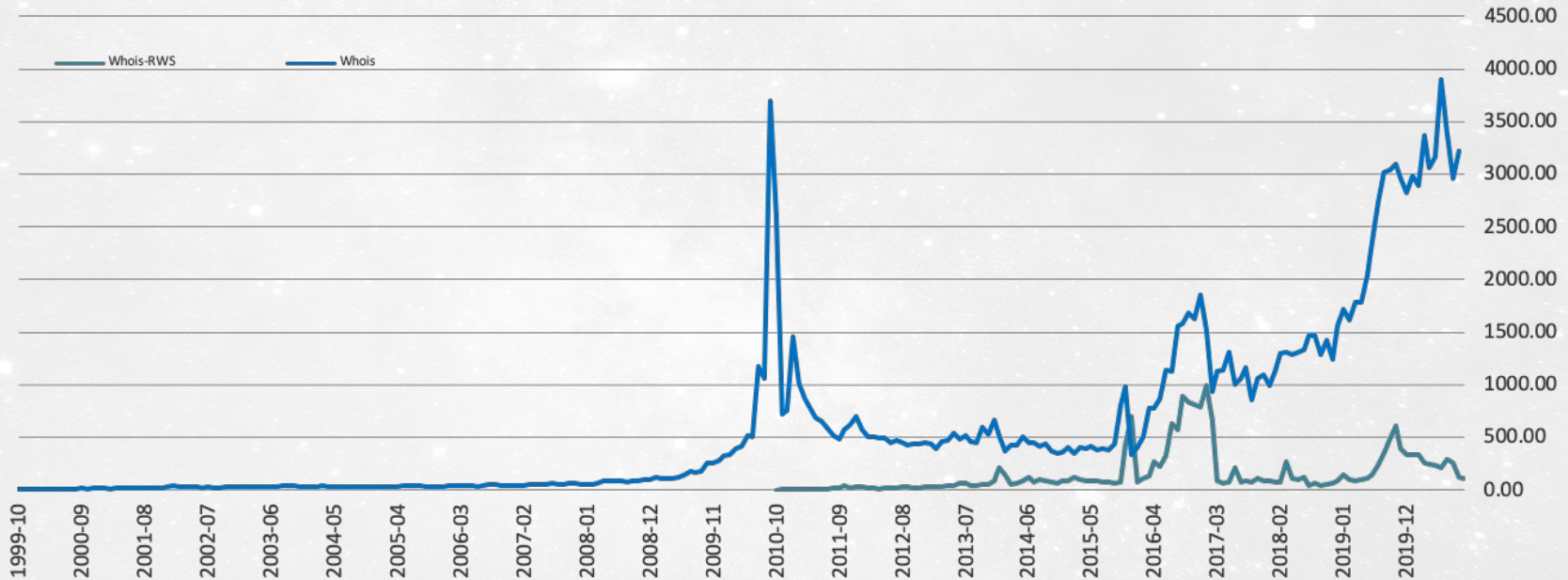
RDAP Statistics

RDAP Queries Per Second

Directory Services Challenge

- Why do we have such increased use?
  - People don't know about getting our data in bulk via bulkwhois?
  - More people legitimately need the data but need it in realtime
  - Malicious bots
  - Using recipes via cloud services to harvest ARIN whois data
- Spent time tuning the systems to deal with increased load
  - Code efficiencies
  - OS tuning
  - Increased use of tarpitting

Thanks!

Any Questions?

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