

people access ARIN's RPKI training videos. As of April 2022, ARIN has already conducted over 10 in person RPKI training events, for hundreds of attendees. These efforts include ARIN meetings; "ROAthon events; and engagements at industry events (such as NANOG, IETF, Canadian Cyber Center, M3AAWG, and WISPA). ARIN offers online training modules as well as in-person RPKI training upon request. ARIN will continue its training efforts well into the future to support RPKI deployment and adoption.

- 2) It is suggested by David Clark, KC Claffy and Cecilia Testart³ that to address ARIN's liability concerns (thus allowing for more relaxed RPKI service agreements and accelerating RPKI adoption), that the US Government could possibly provide some level of statutory protection from liability arising from "mishaps in the operation of their RPKI root."⁴ ARIN is not averse to working with the United States government to explore potential options in this regard. However, ARIN must clarify that the liability that ARIN seeks to mitigate through its present RPKI agreements is not regarding ARIN's performance in delivery of RPKI services (ARIN has and will continue to invest in providing production-quality RPKI services) but rather to **reduce the risk of costly litigation from parties which may inappropriately utilize RPKI services and create inappropriate dependencies on its availability**. With thousands of network operators utilizing RPKI data, the probabilities of inadvertent misconfiguration by some operators of the relatively new RPKI service remains significant. While it is clear to the technically astute that operators should not be impacted from an RPKI service availability issue, litigation is inherently an uncertain domain and could endanger ARIN's overall critical registry services if not clearly limited.
- 3) In light of comments regarding alleged legal barriers to RPKI such as those found in the Yoo filing,⁵ ARIN welcomes feedback regarding its Registration Services Agreement (RSA), and other agreements, and when appropriate and feasible, has updated its agreements including the RSA accordingly. For example, the most recent version of the RSA now provides a contractual obligation for ARIN not to revoke resources based on non-use, which was a concern raised by legacy resource holders in agreeing to an RSA. In addition, the RSA has identical language for its legacy and non-legacy versions which provides consistency and fairness to the community. Furthermore, ARIN easily provides coverage of legacy resources held by entities that have already entered into the current version of the RSA by allowing a legacy resource holder to extend coverage to its legacy resources, while maintaining legacy status, through an addendum to their RSA. ARIN is receptive to additional constructive feedback with reasonable modifications that serve to make resource holders more amenable to entering into the RSA. That being said, it is particularly challenging to consider complete removal of certain contractual protections for ARIN without proposing risk mitigation alternatives. ARIN lastly notes that many legacy resource holders have agreed to ARIN's RSA when being issued IPv4, IPv6 or ASN Internet number resources since ARIN's inception on 22 December 1997.
- 4) In his filing, Mr. Yoo states, "Although legacy resource holders are entitled to receive the same services they were receiving before ARIN came into existence, ARIN requires them to sign the LRSA if they want to receive any new services, including RPKI."⁶ With regards to

³In the Matter of Secure Internet Routing, P.S. Docket 22-90, David Clark, KC Claffy, and Cecilia Testart, FCC-BGP-V3.pdf, Page 7, Posted 4/12/2022, [https://www.fcc.gov/ecfs/search/search-filings/results?q=\(22-90+AND+date_disseminated:\[2022-04-01%20TO%202022-04-29\]\)](https://www.fcc.gov/ecfs/search/search-filings/results?q=(22-90+AND+date_disseminated:[2022-04-01%20TO%202022-04-29]))

⁴ Clark, Claffy, and Testart filing, Page 7

⁵ Yoo Secure Routing filing, page 12

⁶ Yoo Secure Routing filing, page 30

legacy IP address holders, ARIN engages with such holders to inform them of the benefits of entering into an RSA with ARIN and to dispel any misconceptions that doing so impacts their rights to their address block and transferability of same. Entrance into an RSA with ARIN clarifies the relationship of legacy IP address holders with ARIN and provides the benefit of express contractual rights in a writing signed by both parties. ARIN acknowledges that the RSA may be viewed as binding organizations to potential future changes in services, policies, and fees in a manner that is not similar to commercial service agreements. ARIN however, as a membership organization, serves to instantiate the collective cooperation that parties in the Internet industry extend to one another to operate the global Internet. Organizations that enter into an RSA with ARIN are deciding to affirmatively cooperate with their fellow network operators in conformance with the policies that they collectively establish through participation in the governance of ARIN and in the development of related policies. Notably, entities that do not enter into an RSA are still beholden to ARIN's community-developed policies; however, entrance into an RSA provides a more robust opportunity to impact the governance of ARIN.

- 5) CTIA's filing notes "The most recent July 2020 *Botnet Roadmap* status update from DHS and Commerce highlighted ARIN's willingness to waive problematic contract terms"^{7,8} with regards to government entities. ARIN emphasizes its interest in working with such organizations in this regard to modify or remove certain provisions that may be an issue for such entities that are required to adhere to particular provisions of law. These language accommodations may further benefit state and local agencies **including educational institutions**, mentioned in Internet2's⁹ and Andrew Gallo's¹⁰ comments, in pursuit of RPKI adoption. ARIN has specifically modified the language of the RSA for such entities in the provisions regarding bankruptcy, indemnification, limitation of liability, choice of state law, and auto-renewal.
- 6) The Yoo filing¹¹ recommends that ISPs and network operators follow best practices, ARIN could not agree more. ARIN emphasizes, as it did in its initial response, that while the RPKI service is intended to enhance routing security, it also is a goal in the deployment of RPKI to not make the Internet routing system more brittle. This requires that information obtained from RPKI repositories be seen as optional by nature and configured as an additional layer for route validation. To that end, currently accepted best practices for validation of routing information via RPKI require that network operators continue to route as before (i.e., prior to their configuring RPKI) under circumstances where RPKI services are not available. Adherence to this best practice avoids an unresolvable dependency on RPKI such that an issue with the RPKI service would result in significant detrimental effect to routing. ARIN therefore conducts periodic testing and planned outages of RPKI services to help reduce the

⁷In the Matter of Secure Internet Routing, P.S. Docket 22-90, Comments of CTIA re Secure Internet Routing NOI – Final.pdf, Page 20, Posted 4/12/2022, [https://www.fcc.gov/ecfs/search/search-filings/results?q=\(22-90+AND+date_disseminated:\[2022-04-01%20TO%202022-04-29\]\)](https://www.fcc.gov/ecfs/search/search-filings/results?q=(22-90+AND+date_disseminated:[2022-04-01%20TO%202022-04-29]))

⁸ Dep't of Commerce & Dep't of Homeland Sec., Botnet Road Map Status Update, at 15 (July 28, 2020), https://www.commerce.gov/sites/default/files/2020-07/Botnet_Road_Map_Status_Update.pdf

⁹ In the Matter of Secure Internet Routing, P.S. Docket 22-90, Internet Routing NOI – Comments FINAL.pdf, Internet2, Page 2, Posted 4/13/2022, [https://www.fcc.gov/ecfs/search/search-filings/results?q=\(22-90+AND+date_disseminated:\[2022-04-01%20TO%202022-04-29\]\)](https://www.fcc.gov/ecfs/search/search-filings/results?q=(22-90+AND+date_disseminated:[2022-04-01%20TO%202022-04-29]))

¹⁰ In the Matter of Secure Internet Routing, P.S. Docket 22-90, AndrewGallo_comment-22-90.pdf, Page 1, Posted 4/11/2022, [https://www.fcc.gov/ecfs/search/search-filings/results?q=\(22-90+AND+date_disseminated:\[2022-04-01%20TO%202022-04-29\]\)](https://www.fcc.gov/ecfs/search/search-filings/results?q=(22-90+AND+date_disseminated:[2022-04-01%20TO%202022-04-29]))

¹¹ Yoo Secure Routing filing, page 37

probability that network operators have configured their networks' use of RPKI to have an inappropriate hard dependency on the service that would reduce the robustness of Internet routing overall.

- 7) ARIN agrees with the Yoo filing¹² where it is noted that "The [Relying Party Agreement] RPA protects ARIN from undue liability, so any proposal to change it or eliminate it should be approached with caution." That said, the RPA was amended based on community discussion as the Yoo filing¹³ notes "...to enable third-party software providers to collect assent to the RPA as a part of their user interfaces..." This change has had a material positive impact in the adoption of RPKI and did not significantly impact ARIN's liability; demonstrating that ARIN can work with reasonable suggestions to encourage RPKI adoption. In addition, the Yoo filing¹⁴ states that "Interviewees suggested that the value of North American ROAs would vastly improve if ARIN opted for a similar agreement-free path in the RPKI context." While the differing value of a ROA from one region to another is an interesting concept, and parties may feel that lack of an agreement is an easier path for RPKI implementation, ARIN's path through acceptance of the RPA ensures parties have a clear understanding of both the parameters and limits of reliance on RPKI data.
- 8) An obvious goal of ARIN, which The Yoo filing¹⁵ references, "is to ensure ongoing stability and soundness [of RPKI];" therefore in light of the potential liability issues due to operation of an RPKI repository, ARIN has provided clarity regarding its role in the provision of its RPKI service via its agreements as well as encouraging adoption of best practices agreed upon by the technical community with regard to reliance on RPKI data. Absent statutory/government immunity in the provision of services, ARIN must necessarily balance potential liability protection by the use of clear agreements, offsetting any adoption impact through increased promotion of RPKI via robust outreach activities.
- 9) The Yoo filing¹⁶ suggests "publication of more materials like ARIN's Certificate Practices Statement". ARIN agrees that publication of materials is an important component of outreach and transparency; and ARIN does maintain on its website the CPS, the RPA, the RPKI Terms of Service, and the RSA as well as relevant RPKI information regarding the Trust Anchor Locator, Hosted RPKI, Delegated RPKI, ROAs, FAQs, and helpful troubleshooting suggestions. The Yoo filing¹⁷ further suggests that materials be made available to new ARIN customers at the onboarding process. Please note that all these materials are publicly available for review by any party, members as well as non-members, either while considering, or after, engaging with ARIN's services. In addition, ARIN staff remains readily available to speak or correspond with parties that are looking to adopt RPKI or pursue any other ARIN services. Additionally, the Yoo filing suggests "network operators would benefit from greater clarity regarding how the five RIRs [regional internet registries] intend to deliver their RPKI services."¹⁸ All five RIRs maintain a Certification Practice Statement (CPS) which outline how RPKI services are provided. While there are some minor differences among RIR practice statements, they are based on and aligned with the IETF RFC 7382¹⁹

¹² Yoo Secure Routing filing, page 15

¹³ Yoo Secure Routing filing, page 19

¹⁴ Yoo Secure Routing filing, Page 13

¹⁵ Yoo Secure Routing filing, page 14

¹⁶ Yoo Secure Routing filing, page 23

¹⁷ Yoo Secure Routing filing, page 30

¹⁸ Yoo Secure Routing filing, page 38

¹⁹ Template for a Certification Practice Statement (CPS) for the Resource PKI (RPKI) <https://datatracker.ietf.org/doc/html/rfc7382>, S. Kent, D. Kong, K. Seo, April 2015

(Best Current Practice 173), Template for a Certification Practice Statement (CPS) for the Resource PKI, and all statements can be found on each RIR's respective website. ARIN's CPS is available at: <https://www.arin.net/resources/manage/rpki/cps.pdf>

- 10) With regards to the RIRs providing real-time support for RPKI services as mentioned in the Yoo filing,²⁰ ARIN services, such as RPKI, Internet Routing Registry (IRR), Whois registry, Registration Data Access Protocol (RDAP) directory services, and others, are monitored and supported 24 hours per day, 365 days per year – ARIN has always supported its production services in this manner. To be clear, customer support activities, such as individual assistance with RPKI service configuration, are only available during extended business hours (7 AM to 7 PM ET Monday through Friday), as it would be a very significant cost to provide that support on a 24 x 7 basis and would result in significant impact to the service fees paid by all ARIN customers. However, ARIN now offers a Premium Support Plan²¹ which includes 24/7 on-call customer support for Registration Services Plan customers who desire that level of support. The Premier Support Plan is presently in trial with ARIN's largest customers and will soon be made generally available for all customers as an option.

ARIN welcomes the Commission's efforts in advancing the security of Internet routing. Should the Commission recommend the use of advanced routing security technologies that are based on ARIN services, it is important that the Commission also encourage entities to participate in the governance and evolution of these services through ARIN's open community-based processes.

ARIN is grateful for the opportunity to comment on this discussion around secure Internet routing. The ongoing work in this area is of utmost importance and is essential in maintaining a robust, stable, reliable, and secure Internet for all users of the Internet both domestically in the United States and worldwide. We appreciate the Commission's efforts in this regard and remain available to respond to any further questions or comments the Commission may have.

Respectfully submitted,



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²⁰ Yoo Secure Routing filing, page 38

²¹ <https://www.arin.net/resources/fees/psp/>