

Working Document

SSR2 Topics

Overarching matters include:

1. What are the indicators the SSR2 would want to use to measure “success” of security efforts?
2. Collect input from the community on how ICANN should improve on SSR

Sub Topic 1 – SSR1 Review

Topic	Review of implementation of SSR1 Report
Related Bylaw	4.6 (c)(iv)
Skillset	ICANN, Policy, SSR1
Description of activity	The sub team will be responsible for reviewing the implementation of the SSR1 RTs work and drafting a document outlining the effectiveness of said implementation
Work Items	<ol style="list-style-type: none">1. Complete the assessment of the implementation of SSR1 recommendations, the impact of the implementation, how the post implementation is being managed and what implications for the SSR2 review.2. With regards to SSR1, implementation of Rec 7, 10, 11 and 27, to see to what extent the current OCTO research feeds into the risk management framework especially in relation to the SSR of unique identifier space.3. Risk Assessment and Management relevant to SSR4. What are the indicators for “successful” implementations and intended effects?5. What are the key performance indicators?6. How do we get an understanding of what SSR1 recommendations have been implemented?7. Which extent of SSR1 recommendations implemented?8. How does ICANN compliance impact SSR?9. Define a set of metrics to measure the effectiveness of the implementation10. Note about SO/AC recommendations on security including R/SSAC?

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Rapporteur	Alain

Sub Topic 2 – ICANN SSR

Topic	Inward Facing (formerly ICANN SSR)
Related Bylaw	4.6 (c)(ii)(A) 4.6 (c)(ii)(B) 4.6 (c)(iii)
Skillset	Information Security Management (ISM), Audit (AUD), Risk Management (RM), Business Continuity Management (BCM), Legal (LG)
Description of activity	The sub team will be responsible for reviewing the completeness and effectiveness of ICANNs internal security processes, the effectiveness of the ICANN security framework, and SSR activities performed or led by ICANN.

**Work Items - Key
Action Steps**

1. Perform a high-level review of ICANN's internal security, stability and resiliency operations processes. This includes, but is not limited to:

- Allocation of resources and priority within the organization (includes budget and staffing)
- GDD Operations
- Deployment/operations of network infrastructure
- Operational system hygiene
- EBERO
- Centralized Zone Data Service
- SLAM (Arias)
- Outreach and public information role (training, vulnerability disclosure, system attack mitigation etc)

Categorize and prioritize the outcome of the analysis

2. Perform a high-level review of ICANN's activities related to Information Security Management. This includes:

- Leadership, roles and responsibilities
- Risk management and risk treatment
- Resources, competence, awareness and communication
- Access control and Cryptography
- Physical and environmental security
- Operational security
- System acquisition, development and maintenance
- Supplier relationships

Categorize and prioritize the outcome of the analysis

3. Perform a high-level review of ICANN's Business Continuity Management. This includes:

- Business Continuity Objectives and Plans
- Operational planning and control
- Business Continuity Strategies
- Prioritised Activity Recovery Strategy
- Resource Recovery Strategy
- BC Procedures - Incident Response Structure
- Business Continuity Plans (BCP)
- Evaluation of Business Continuity Procedures

Categorize and prioritize the outcome of the analysis

4. Perform a high-level review how effectively ICANN has implemented its Security Incident Management Process to reduce (pro-actively) the probability of ~~DNS-related~~ operational security incidents.

- List general categories of incidents, eg DoS, etc.
- ICANN operational responsibilities
- L-Root
- security training of staff

5. Perform a high-level review how effectively ICANN has exercised its Security Incident Response Process relating to a global incident?:

- assist / conduct interested parties
- Action: Conduct gap analysis, document lessons learned

7. Perform a high-level review of how effectively ICANN has carried out its SSR-related obligations in the registrar and registry agreements and IDN fast track program:

- ICANN Compliance sub-items (Level of compliance requirement for registrars agreements)
- review of how effectively ICANN has implemented its processes around vetting registry services. This includes, but is not limited to:
 - Back-End Registry Operator (BERO)
 - Emergency Back-End Registry Operator (EBERO)
 - Registry Data Escrow (RyDE) - Data Escrow Agent (DEA)
 - Centralized Zone Data Service (CZDS)
 - Bulk Registration Data Access (BRDA)
 - SLA Monitoring System (SLAM)
- Categorize and prioritize the outcome of the analysis
- Summarize all the (non)conformities and write a report

8. Perform and review of ICANN's activities related to data gathering, analysis, publication and use of DNS health and abuse

- The evidence base: DNS health index and abuse data. What the evidence tells us; access to information (risks and benefits)

	<ul style="list-style-type: none"> - DAAR status and use <p>9. WHOIS issues</p> <ul style="list-style-type: none"> - Accuracy, Privacy and Proxy Services - VPNs, TORs, VPS - Current WHOIS spec & its implementation, impact on security, stability (including abuse) <p>10. Root server Security Issues (Need discussion)</p> <ul style="list-style-type: none"> - RFC 2870 Compliance - Issues with anycast servers
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Rapporteur	Boban

Sub Topic 3 – DNS SSR

Topic	Outward Facing (formerly DNS SSR)
Related Bylaw	4.6 (c)(ii)(A) 4.6 (c)(ii)(C)
Skillset	DNS Security, RIR, IETF, Risk Management
Description of activity	The sub team will be responsible for reviewing ICANNs role in the broader security of the DNS and unique identifiers system, including its role in mitigating threats to the DNS and other unique identities it coordinates

<p>Work Items</p>	<p>1. Universal resolvability: Can identifiers be uniquely resolved and consumed?</p> <ul style="list-style-type: none"> - Name collisions (status and remediations) - Universal resolvability and the internet of things - IPv6 / CGN complexity (query the role of ICANN on this?) <p>2. ICANN role in Improving the security of unique identifiers (includes threat mitigation)</p> <ul style="list-style-type: none"> - Authoritative domain name servers - Domain name registration data, registries, registrars, and registrants - IP addresses and autonomous system numbers (ASNs) employed by the global Internet routing system (Note: Will continue to flesh out exact role of ICANN) <p>3. DNSSec (progress, Key rollover)</p> <p>4. Domain name abuse mitigation as it affects SSR issues (Note: More info on ICANN's specific role is needed)</p> <p>5. Universal acceptance: Can identifiers be consumed by clients</p> <ul style="list-style-type: none"> - IDNs and new gTLDs - Platforms, approaches, and status <p>6. Proactive measures (Advisories, Technical alerts)</p> <p>7. Analyze universal accessibility and resolution of unique identifiers systems</p> <p>8. Assess DNS threat landscape, domain abuse, and mitigation relevant to ICANN's role</p> <p>9. What are the actual and potential challenges and threats?</p> <p>10. Which portion of the Internet systems of unique identifiers does ICANN not coordinate?</p> <p>11. What are the SSR issues with new gTLD's?</p> <p>12. What are the SSR issues with the way PTI meets their SLAs?</p> <ul style="list-style-type: none"> - How long does it take to replace a DNSSEC key for a TLD? <p>{{ What needs to be added here from https://docs.google.com/document/d/1KWvdcZ2g8hBxUzvzPqgzVmsT4RZ5Cblo-N2lpUUYuAw/edit# }}</p>
<p>Team Members</p>	<p>Alain, Matogoro, Ram Krishna, Geoff, Amin Hasbini, Žarko, Eric, Boban</p>
<p>Rapporteur</p>	<p>Eric</p>

Sub Topic 4 – Future Challenges

Sub Topic 4 – Emerging and Future Challenges	
Topic	Future Challenges
Related Bylaw	4.6 (c)(iii)
Skillset	Threat Intel, Policy, Cybersecurity, IETF
Description of activity	The sub team will be responsible for reviewing the long term strategy of ICANN to plan for and mitigate potential threats to the secure and resilient operation of the unique identifiers systems it coordinates.
Topics for Consideration	<ol style="list-style-type: none"> 1. How do we assess “Future challenges to security and stability a DNS?” 2. Explore forecasting research on the Internet unique identifiers 3. What has been, or could be, the impact of the evolution and the number and types of devices in the DNS? 4. How effective are ICANN’s security efforts to known threats and preparation for future threats? 5. What emerging technologies and trends should we consider? [new items to discuss] : <ul style="list-style-type: none"> ● ICANN OCTO Middleware research ● ICANN Emerging Technologies (ask ICANN) ● Internet Governance issues ● Privacy regulation i.e. GDPR

Definitions

Assets – What are we trying to protect. Attackers can use an Identifier System(s) to target and attack property, information, or people, e.g., by using the DNS to implement denial of service attacks. They can also attack aspects of an Identifier System by using it in a manner that is abusive or malicious, for example, by using fraudulent registration information or hijacking names or addresses. Importantly, these forms of attacks can be executed in tandem. Each of these assets performs a different critical function; a specific attack against one may threaten the security, stability, or resiliency of the Identifier System as a whole.

These assets include:

- Authoritative domain name servers and recursive and stub resolvers, as well as domain name registration data, registries, registrars, and registrants.
- IP addresses and autonomous system numbers (ASNs) employed by the global Internet routing system, along with associated network infrastructure components (e.g., routers, switches, address management systems) and regional Internet registries.

Protocol parameters and the implementations of the associated protocols that make use of those parameters, both individually and within the context of larger systems that incorporate those protocols and protocol parameters.

Vulnerabilities – Weaknesses or gaps that can be exploited. Vulnerabilities may be flaws within Identifier System assets themselves, or within measures intended to protect them. These vulnerabilities include design defects, coding errors, configuration mistakes, and other gaps that weaken an asset's attack resistance, stability, or resiliency.

Threats – What we're trying to protect against. Threats include both entities and events which may exploit an asset's vulnerabilities. Threats to Identifier System assets include attacks against domain name servers and name resolvers, or network elements such as routers or switches. The threat landscape

includes attacks against domain and address registration services as well as natural disasters such as storms that trigger power and network outages which degrade Identifier System operations.

Risk – The probability that threats will exploit vulnerabilities to obtain, damage or destroy assets. In this document, we attempt to identify high-risk types of attacks against Identifier System assets. To do so, we focus on high-impact vulnerabilities that are being actively exploited by threats, as well as new vulnerabilities at high risk of exploitation.

**Work Items/
Areas of Focus**

~~Root zone management—software change~~

Top Identifier System Attacks

- ~~● Route Insertion Attacks~~
 - ~~○ As it affects the unique ID system (what could happen, how it could be prevented, etc.)~~
- Coalescence of registrars/registry/backend operators for multiple TLDs - EO, DM, NR, BK
 - Q: Complete list of backend registry operators - Escrow providers.
 - Q: Measurements/ analysis/ testing of exercising the above functions?
 - Q: Is there a periodic report of domain names (number registrars, etc.)?
 - Q: Has ICANN identified the issue of coalescence of registrars/registry operators in their risk management and what are the measures to be taken?
 - Q: Are there higher security requirements for backend operators running multiple TLD's?
 - Q: Are there any and if so, what are the control mechanisms for operational availability of the TLD's?
- Access to data, info, research on important abuse/attack vectors - LW, NR, DM, EO, SM, JM
 - Criminal Abuse and State-sponsored Attacks: Abuse trends and future threats -
 - E.g. Multitudes of victims for one high-value compromise/outage/etc.
 - DNS Denial of Service Attacks (coordinate w/other Sub-Topics)
 - DNS DDoS Attacks
 - Web Services Attacks impacting Identifier Resources
 - Software
 - Resource Registration Account Compromises
 - Identifier Hijacking via Social Engineering
 - Machine Learning to aid the attacker
 - Machine Learning to help detect abuse
 - Are you talking to a robot?
 - ML used for abusive registrations

- Q: Does the TEG or some other group provide information about (future) abuse and attack vectors? Where?

- ~~DNS Zone File Attacks~~

- ~~?~~

- ~~Parallel Root Name System Risks~~

- ~~Namespace ambiguity/competition/etc~~

- ~~DNS and Surveillance Attacks~~

- ~~Undermining DNS' utility and perceived trustworthiness~~

- ~~DNS Misuse as Covert Channel~~

- ~~How the attacks (TTPs) are evolving to use identifier spaces in new ways~~
- ~~Empower ICANN to investigate attacks that are using new and more sophisticated TTPs~~

New dependencies:

- New crypto-systems in DNSSEC - EO, RH, RP, LW
 - Can DNSSEC continue to offer security in the future and evolved where it needs to (e.g. PQ)



- Q: Does the TEG or some other group provide information about new crypto algorithms? Where?
- Q: What resources and processes are in place to track and make board aware and factor into strategic planning for this?
- Q: What analyses or study/studies have been done?

- ~~New uses for DNS (IoT, etc.) - LW, EO~~

- ~~Can the DNS evolve as new systems use it~~
- ~~Q: Are there any groups, reports, or is there any work being done to track new uses of DNS?~~
- ~~Q: Has ICANN identified any scenarios where the current DNS infrastructure would fail?~~

- ~~Threat Intelligence blindspots~~

- ~~When technologies like QName Minimisation [sic] and DNS over TLS hide necessary telemetry from whitehats, miscreants have more latitude~~

- Alternate naming systems (interactions, conflicts, etc.)
 - NR, LW, EO
 - Blockchain, e.g. Namecoin, ENS, etc.
 - Other DNS-less systems
 - Walled gardens?
 - Censoring
 - Q: Does ICANN track these developments, what are the findings, and how do they feed into ICANN operations and policy?

- ~~Loss of confidence in standards bodies~~
- ~~Adoption of systems that don't adhere to standards~~

Performance security (SSR2 scope):

~~Issue high level recommendations towards ICANN technologies (routing, switching, computing environments, DNS related services) resources utilization (Traffic, processing/power/memory utilization, ...)~~

- ~~Identify a list of the types of technologies used by ICANN~~
- ~~Recommend forecasting techniques to be used by ICANN to determine future utilization~~
- ~~ICANN role in return: Recommendations need to be considered in future technological planning or architecture designs by ICANN.~~

Technology selection security (SSR2 scope):

- ~~Vendor security technology evaluation process (how to test solutions)~~
- ~~Vendor security technology selection process (how to select a solution)~~
- ~~Vendor security technology implementation process (what vendors need to do when deploying solutions)~~
- ~~Vendor security maintenance process (how vendors should maintain their solutions)~~
- ~~Vendor responsibilities and SLAs (patching vulnerabilities, technology development/deployment)~~
- ~~Vendor accountability for security problems~~
- ~~ICANN role in return: Selection recommendations need to be considered in future technology selection processes employed by ICANN~~

Threat intelligence (SSR2 scope):

- The need for an ICANN threat intelligence team
- The need for ICANN to have established communication with top threat intelligence sources to know about the latest threats
- The need for adapting threat intelligence internally, to identify attacks and threats accordingly
- ICANN role in return: Threat intelligence recommendations to be adapted by ICANN towards enhancing blocking of cyber attacks, identifying causes of new breaches, and knowing about the latest threats endangering similar organizations.

NB1: Recommendations provided should be vendor/technology neutral, as to be valid for future utilization

NB2: issues of DDOs, route injection all fall under "Sub-Topic 3 – DNS SSR" as they are issues probably currently being dealt with. What is not dealt with, is how they could be used in the future, which falls under threat intelligence. I do not believe should predict protocols misuse options through new vulnerabilities, which has an unlimited scope.

- Root server system protection: assess the threatscape of top threats (e.g. DDoS to the root system) -KB, EO, NR, LW
Was the threatscape documented and shared with the community/RSOs?
 - <https://www.icann.org/en/system/files/files/rssac-review-final-02jul18-en.pdf>
 - Q: What does staff and the community already do regarding emerging and future threats, and related issues? We are aware of efforts focussed on emerging technologies; are there ones that focus on threats too?

- Identify KPI for SSR measurements
Request / commission analysis of KPIs for the root (others)?

- Privacy protections - EO, NR, LW, KB
 - DNS over TLS / over HTTPS
 - Circular dependencies between WebPKI and DNSSEC
 - Impact on Proactive anti-abuse and investigations
 - Q: Does ICANN track these developments, what are the findings, and how do they feed into ICANN operations and policy?
 - Q: how will they continue to follow up on the GDPR and related decisions?

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Rapporteur	Kerry-Ann

Sub Topic 5 – IANA Transition

Topic	IANA Transition Impact
Related Bylaw	4.6 (c)(ii)(B) 4.6 (c)(iii)
Skillset	IANA, CCWG, IETF, RIR, Risk Management
Description of activity	The sub team will be responsible for reviewing the impact of the IANA transition on the security of ICANN and the unique identifier systems it coordinates
Work Items	1. What are the changes to ICANN SSR with the IANA transition? 2. Business continuity plan for new IANA functions operator (Note: C7.3 replacement)
Team Members	Geoff, Eric
Rapporteur	

Orphan topics (not assigned to any of the above categories):

1. Analyze the possibilities for faster exchange of information on methods of abuse of Internet unique identifiers and recommendations for mitigation
2. What are the benchmarks and good practices for successful security efforts? (note duplicates)
3. How can we measure “the extent” of ICANN’s success in implementing security efforts?
4. How the end-user feel secure, reliable, instable (Note: avoid duplication of CCT research)
5. Root server stability, security

Laurin: 2 and 3 in particular seem to be related, is this something we can tackle as part of a report? We should be talking about these in particular, having seen this is an issue based on the SSR1 recommendations.