

Name Collision Analysis Project (NCAP) Update

GNSO Council Meeting
15 February

Background

2017: ICANN Board tasked SSAC to conduct studies to present data, analysis and points of view, and provide advice to the Board on name collisions

- Specific advice regarding .home/.corp/.mail
- General advice regarding name collisions going forward

NCAP analysis and recommendations

1. Provide means to preserve security & stability of the internet namespace
2. Analyze real-life impact of name collisions and rationale to take this seriously
3. Directly impact **the** next TLD round **and all future rounds**

Risks to security and stability of name collisions*

1. Potential for significant collision strings still occurs
2. Case studies of CORP, HOME, and MAIL indicates the potential for *impact* has increased
3. Critical Diagnostic Measurements help predict the *impact* of name collisions
4. The impact of TLD delegation ranges from no impact to severe impact
5. Private use of DNS suffixes is widespread
6. Name collision reports are supported strongly by measured data
7. DNS-SD protocols and suffix search lists are a major problem

Name collisions will continue to be a difficult problem to identify and remediate

* For the complete list of findings, see Report

Remediation and Prevention*

1. Establish dedicated Technical Review Team function
2. Treat name collisions as a risk management problem
3. Support the delegation of strings in order to improve the ability to conduct a name collision risk assessment
4. Replace existing Name Collision Management Framework with the recommended Name Collision Risk Assessment Framework
5. Create a Collision String List
6. Develop and document a process for the emergency change
7. No need for Study 3

* For the complete list of recommendations, see Report

Background Slides

NCAP Studies

- **Study One: Gap Analysis**
 - Properly define name collision
 - Review and analyze past studies and work on name collision and perform a gap analysis
- **Study Two: Root Cause and Impact Analysis**
 - Suggested criteria for determining whether an undelegated string should be considered a string that manifests name collisions, i.e., is a “collision string”
 - Suggested criteria for determining whether a Collision String should not be delegated
 - Suggested criteria for determining how to remove an undelegated string from the list of “Collision Strings” (aka mitigations)
- **Study Three: Analysis of Mitigation Options (*Recommended by DG to cancel Study 3*)**
 - Identification and assessment of mitigation options
 - Production of recommendations regarding delegation

Completed Work in Study 2

- **Case Study of Collision Strings**
 - Studies of .corp, .home, .mail, .internal, .lan, and .local using DNS query data from A and J root servers
 - Highlight changes over time of the properties of DNS queries and traffic alterations as a result of DNS evolution
- **A Perspective Study of DNS Queries for Nonexistent Top-Level Domains**
 - Aims to understand the distribution of DNS name collision traffic throughout the DNS hierarchy
 - Provide insights into where and how DNS data can be collected and assessed
- **Root Cause Analysis - New gTLD Collisions**
 - Seeks to analyze various aspects of name collisions and the 2012 round controlled interruption to identify the root cause of related incidents reported by affected parties

Key Takeaways of Study 2

- Case Study
 - Case studies of CORP, HOME, and MAIL indicates the potential for *impact* has increased
 - Critical Diagnostic Measurements help predict the *impact* of name collisions
 - Leaking collision strings differ from delegated TLD queries
 - DNS-SD protocols and suffix search lists are a major problem
 - Potential for significant collision strings still occurs
- Perspective of DNS Queries
 - Study shows similarities and differences of RSIs and PRR
 - Existing measurement platforms could be extended to help inform applicants
- Root Cause Analysis
 - Private use of DNS suffixes is widespread
 - Name collision reports are supported strongly by measured data
 - The impact of TLD delegation ranged from no impact to severe impact
- **Name collisions are and will continue to be a difficult problem to identify and remediate**

Findings of NCAP Study 2 Report

Findings

1. The definition of what is a name collision has evolved over time
2. Name Collision Identification and Quantification
 1. Name collisions continue to persist within the DNS
 2. There are limitations with using currently available data sources for understanding root cause and risk, or designing mitigation and remediation plans
 3. .CORP and .HOME demonstrated that high volume is an insufficient measure for analyzing the potential of high-risk impact
 4. It is possible that future name collisions may occur on the scale of .CORP, .HOME, and .MAIL
 5. It is impractical to create a do-not-apply list of strings in advance of new requests for delegation

Findings

3. Data Manipulation Risks

1. There is a risk for CDM (Critical Diagnostic Measurements) data manipulation
2. Data manipulation has ramifications beyond the technical aspects of name collision that are influenced by when analysis occurs

4. Quantitative and Qualitative Measurement Considerations

1. Critical Diagnostic Measurements are structurally quantitative and benefit from supplemental qualitative information
2. The quantitative data in CDMs can be improved

Findings

5. Notification to users of name collisions is a critical function and separate from assessment or remediation
 1. Controlled Interruption as a notification method is effective in some but not all instances
 2. Other methods for notification may be used but remain untested.
 3. The criteria for the use of ICANN's name collision reporting form negatively impacted its use
6. Predicting the rate and scale of change in the root zone is not possible in advance of a new round of gTLDs

Findings

7. There is no process for emergency changes to the root zone when considering the temporary delegation of strings
8. The adoption of IPv6 has grown significantly since 2012
9. Reserved private-use strings may mitigate the risk of name collisions over the long term but not the short term.

Proposed Name Collision Risk Assessment Framework

What Problem Are We Trying To Solve?

Name collision analysis is a risk management problem

ICANN Board needs a methodology for evaluating and reducing the risk of delegation of a new TLD proposed string.

- Propose a methodology for identifying collision strings (“high risk” labels) that should not be delegated
- No other string would be blocked as a result of name collisions

Is it possible to objectively identify a *high-risk* or a *do-not-apply* label?

- If not, is it possible to provide guidance to identify a *high-risk* or a *do-not-apply* label?

Goals of the Proposed Name Collision Risk Assessment Framework

1. To ensure that name collisions can be assessed
 - Requires name collisions to be visible, if they exist
2. To ensure there is an opportunity for a mitigation or remediation plan to be developed and assessed
 - Requires understanding the cause for name collision to develop and assess a mitigation and/or remediation plan
 - All remediation and mitigation plans are all purpose-built

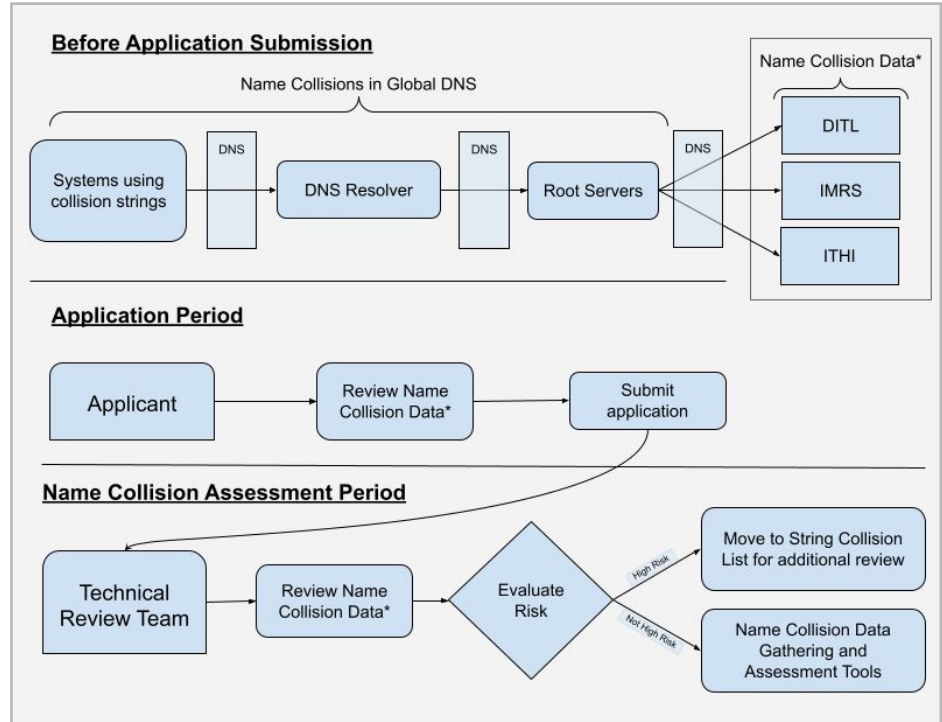
Stage 1 of Name Collision Risk Assessment Framework

The framework includes multiple assessments of a requested string by both:

- the **applicant** and
- the **Technical Review Team**

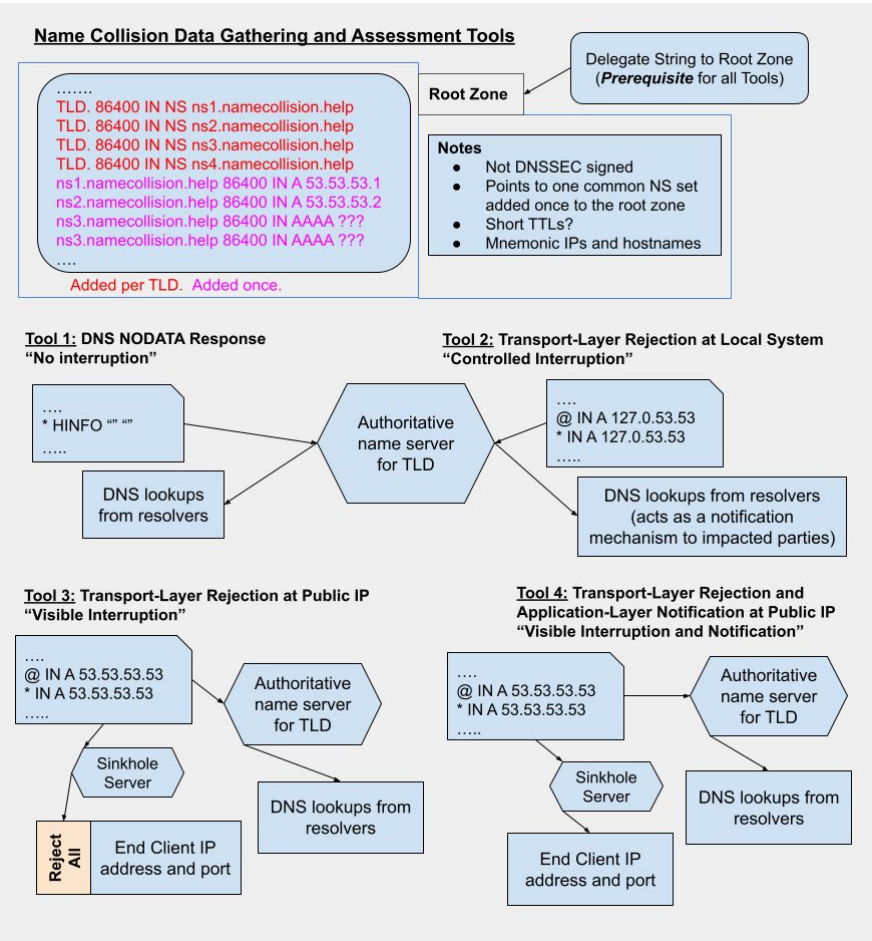
High-Risk strings would be moved to a *String Collision List* for additional review

Strings that are *not high-risk* would move to *Stage 2*



Stage 2 of Framework

- The NCAP DG identified various Name Collision Data Gathering and Assessment Tools.
 - There are four proposed methods.
- Additional data gathering and assessment methods are possible, but were untested by the NCAP DG.



Technical Review Team

- Need to be independent and neutral experts
- Technical expertise must include:
 - Knowledge and understanding of:
 - DNS specifications, provisioning, and operation
 - Internet infrastructure and where it intersects with the DNS and with application/services usage of the DNS
 - Ability to:
 - Review and understand data collected (e.g., CDMs)
 - Understand and assess risk
- Four responsibilities
 - Assess the visibility of name collisions
 - Document data, findings, and recommendation(s)
 - Assess mitigation and remediation plan
 - Emergency response

Recommendations of NCAP Study 2

Recommendations

1. ICANN should treat name collisions as a risk management problem.
2. ICANN should adopt a consistent definition for name collision
3. ICANN should continue its education and outreach efforts to the community on the name-collision topic
4. ICANN should consider the need for mitigation and remediation efforts for high-risk strings
 1. ICANN should submit .CORP, .HOME, and .MAIL through the Name Collision Risk Assessment Process
5. ICANN must support the delegation of strings in order to improve the ability to conduct a name collision risk assessment

Recommendations

6. ICANN should establish and maintain a longitudinal DNS name collision repository in order to facilitate risk assessments and help identify potential data manipulation
7. ICANN should establish a dedicated Technical Review Team function
8. ICANN should replace the existing Name Collision Management Framework with the recommended Name Collision Risk Assessment Framework
 1. ICANN should not reject a TLD solely based on the volume of name collisions
 2. ICANN should request special attention to strings with high-impact risks during the name collision assessment process
 3. ICANN should update its public-facing name collision reporting process

Recommendations

9. ICANN should create a Collision String List
 1. ICANN should support a mechanism that allows applicants to request a string be removed from the Collision String List
10. ICANN must develop and document a process for the emergency change related to a temporarily delegated string from the root zone due to collision risk or harms
11. ICANN should not move ahead with NCAP Study 3