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IDN Table Review Tool

Agenda Item #1
Background

- A generic top-level domain (gTLD) registry operator that intends to offer registrations in different languages and scripts must:
  - Define an IDN table for each language and script.
  - Get it approved by ICANN during:
    - IDN RSEP Service.
    - Registry System Testing (RST) for Registry Service Provider (RSP) Change.
    - RST for Pre-Delegation Testing (PDT).

- ICANN reviews the IDN table(s) for security and stability considerations.
The IDN Table Review Tool was developed to:

- Increase efficiency in reviewing IDN tables.
- Promote consistency and transparency of reviews.

The tool is available online for ICANN org and registry operators.

- Input: IDN table and relevant reference LGR.
- Output: IDN table review report in HTML format.

The same review analysis is available for ICANN org and contracted parties which helps make the process transparent.

Comparison is always done with the published reference LGR which helps make the process consistent.
How to Use the IDN Table Review Tool

- Step 1: Upload the IDN table(s).
- Step 2: Select the reference LGR for comparison.
- Step 3: Review the HTML output report.
IDN Table Tool Interface

- A user guide with more information is published on the [LGR Tool webpage](https://lgrtool.icann.org/).
- URL for IDN Table Review Tool [https://lgrtool.icann.org/](https://lgrtool.icann.org/) (available in coming weeks).
Step 1: Upload the IDN Table(s)

Step 1-1: Click the “Review IDN table(s)” menu.

Click to start using the IDN Table Review function
Step 1: Upload the IDN Table(s)

Step 1-2: Click “Choose Files” and select the IDN table(s) for review (the tool can review up to 20 IDN tables at a time), then click ”Next…”

1. Click and upload IDN table(s) in .xml (RFC 7940) or .txt (RFC 3743, RFC 4290)

2. Click “Next..”
Step 2: Select the Reference LGR for Comparison

Step 2-1: For each IDN table uploaded, select the relevant reference LGR from the dropdown list. RZ-LGR 5 is shown which can be changed from Managing LGR tool option if logged in using admin account.

Click to expand the list or type some part of the reference LGRs name in, then select.
Step 2: Select the Reference LGR for Comparison

Step 2-2: For each IDN table uploaded, it can be reviewed against any LGR by uploading it manually using “Review against xml” option as below. Then upload LGR xml
Step 2: Select the Reference LGR for Comparison

Step 2-2: the HTML output reports can be viewed online or downloaded to a user’s local machine.

![IDN Table Review Reports](image-url)
Step 3: Review the HTML Output Report

- The IDN Table Review Tool generates a report in HTML format for each uploaded IDN table.

- Each report includes:
  - Report Header: details of the IDN table and the reference LGR.
  - Overall Summary: a quick summary of results.
  - Detail Analysis for Each Section:
    - Language Tag
    - Repertoire
    - Variant Sets
    - Classes
    - WLE Rules
    - Actions
### Structure of HTML Output Report

#### IDN Table Review Report

<table>
<thead>
<tr>
<th>Table of Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Summary</td>
</tr>
<tr>
<td>2 Language Tag</td>
</tr>
<tr>
<td>3 Report type</td>
</tr>
<tr>
<td>4 Variant sets</td>
</tr>
<tr>
<td>5 Classes</td>
</tr>
<tr>
<td>6 Whole label evaluation rules</td>
</tr>
<tr>
<td>7 Actions</td>
</tr>
</tbody>
</table>

#### Overall Summary

<table>
<thead>
<tr>
<th>#</th>
<th>Comparing Item</th>
<th>Overall Result</th>
<th>Result</th>
<th>Summarized Remarks</th>
<th>Remark occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Language Tag</td>
<td>MATCH</td>
<td>MATCH</td>
<td>Exact match</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Report type</td>
<td>MANUAL CHECK</td>
<td>MANUAL CHECK</td>
<td>The code point only exists in the IDN Table but not in the reference LGR</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MATCH</td>
<td>MATCH</td>
<td>Match as code point (including tags, content rules)</td>
<td>127</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOTE</td>
<td></td>
<td>Rules not required in Reference LGR</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Variant sets</td>
<td>REVIEW</td>
<td>MANUAL CHECK</td>
<td>Variant set only exists in the IDN Table</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>REVIEW</td>
<td>Variant type in the IDN Table is less conservative compared to the Ref. LGR</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MATCH</td>
<td>MATCH</td>
<td>Exact match (including type, conditional variant rules)</td>
<td>177</td>
</tr>
<tr>
<td>4</td>
<td>Classes</td>
<td>MANUAL CHECK</td>
<td>MANUAL CHECK</td>
<td>Mutation class with only additional code points</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MANUAL CHECK</td>
<td>MANUAL CHECK</td>
<td>Mutation class (class does not exist in ref. LGR; check for different class names)</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Whole label evaluation rules</td>
<td>MANUAL CHECK</td>
<td>MANUAL CHECK</td>
<td>Mutation (XML rule only exists in IDN Table)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MANUAL CHECK</td>
<td>MANUAL CHECK</td>
<td>Match (matched names and content)</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MATCH</td>
<td>MATCH</td>
<td>Exact Match (matched names and content)</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MANUAL CHECK</td>
<td>MANUAL CHECK</td>
<td>Mutation (XML rule only exists in Ref. LGR)</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Actions</td>
<td>MANUAL CHECK</td>
<td>MANUAL CHECK</td>
<td>Mutation (additional action)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MATCH</td>
<td>MATCH</td>
<td>Exact Match (action name and content are the same)</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MANUAL CHECK</td>
<td>MANUAL CHECK</td>
<td>Mutation (missing action)</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Language Tag

<table>
<thead>
<tr>
<th>IDN Table language tag</th>
<th>Ref. LGR language tag</th>
<th>Result</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>(more data)</td>
<td></td>
<td>MATCH</td>
<td>Exact match</td>
</tr>
</tbody>
</table>

#### Repertoire

<table>
<thead>
<tr>
<th>#</th>
<th>Code Point</th>
<th>Glyph</th>
<th>Name</th>
<th>IDN Table</th>
<th>Ref. LGR</th>
<th>Result</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>U+002D</td>
<td>-</td>
<td>HYPHEN-MINUS</td>
<td>✓</td>
<td>MANUAL CHECK</td>
<td>The code point only exists in the IDN Table but not in the reference LGR</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>-</td>
<td>NULL</td>
<td></td>
<td>MANUAL</td>
<td>The code point only exists in the IDN Table but not in the reference LGR</td>
<td></td>
</tr>
</tbody>
</table>

---

**Report Header**

**Overall Summary**

**Detail Analysis**
Report Header

- Report Header includes:
  - Table of contents
  - Date of comparison
  - IDN table name and version, if available
  - Reference LGR name and version

IDN Table Review Report

Table of Contents

1 Summary
2 Language Tag
3 Repertoire
4 Variant Sets
5 Classes
6 Whole label evaluation rules
7 Actions

Date: Oct. 20, 2022

Please refer to the LGR (IDN Table) Review Tool disclaimer on this page

This document presents the review report for IDN Table: 
igf-second-level-arabic-script-31may22-en Version: 3 with the Reference LGR: 
igf-5-arabic-script-26may22-en Version: 5
Overall Summary

- Overall Summary includes:
  - The result for each section.
    - Result categories: MATCH, SUBSET, NOTE, MANUAL CHECK, REVIEW.
  - Remarks and their occurrences.

### Overall Summary

<table>
<thead>
<tr>
<th>#</th>
<th>Comparing Item</th>
<th>Overall Result</th>
<th>Result</th>
<th>Summarized Remarks</th>
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<tbody>
<tr>
<td>1</td>
<td>Language Tag</td>
<td>MATCH</td>
<td>MATCH</td>
<td>Exact match</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Repertoire</td>
<td>MANUAL CHECK</td>
<td>MANUAL CHECK</td>
<td>The code point only exists in the IDN Table but not in the reference LGR</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MATCH</td>
<td>Matches code point (including tags, context rule)</td>
<td>127</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NOTE</td>
<td>Rules not required in Reference LGR</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Variant Sets</td>
<td>REVIEW</td>
<td>MANUAL CHECK</td>
<td>Variant set only exists in the IDN Table</td>
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</tr>
<tr>
<td></td>
<td></td>
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<td>REVIEW</td>
<td>Variant type in the IDN Table is loss conservative compared to the Ref. LGR</td>
<td>15</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>MATCH</td>
<td>Exact match (including type, conditional variant rule)</td>
<td>177</td>
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<tr>
<td>4</td>
<td>Classes</td>
<td>MANUAL CHECK</td>
<td>MANUAL CHECK</td>
<td>Mismatch class with only additional code points</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MANUAL CHECK</td>
<td>Mismatch class (class does not exist in ref. LGR; check for different class names)</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Whole label evaluation</td>
<td>MANUAL CHECK</td>
<td>MANUAL CHECK</td>
<td>Mismatch (WLE rule only exists in IDN Table)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>rules</td>
<td></td>
<td>MATCH</td>
<td>Exact Match (matched names and content)</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MANUAL CHECK</td>
<td>Mismatch (WLE rule only exists in Ref. LGR)</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Actions</td>
<td>MANUAL CHECK</td>
<td>MANUAL CHECK</td>
<td>Mismatch (additional action)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MATCH</td>
<td>Exact Match (action name and content are the same)</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MANUAL CHECK</td>
<td>Mismatch (missing action)</td>
<td>4</td>
</tr>
</tbody>
</table>
## Output Result Interpretation

<table>
<thead>
<tr>
<th>Result</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATCH</td>
<td>Data in IDN table exactly matches the data in the reference LGR.</td>
</tr>
<tr>
<td>SUBSET</td>
<td>Data in IDN table matches the data in the reference LGR and does not create security issue; e.g., IDN table code point repertoire is a subset of reference LGR code point repertoire.</td>
</tr>
<tr>
<td>NOTE</td>
<td>Data in the IDN table is more conservative than data in the reference LGR; e.g., IDN table applies some additional rules on the code points while reference LGR does not.</td>
</tr>
<tr>
<td>MANUAL CHECK</td>
<td>The tool finds a deviation from the reference LGR but cannot decide whether the deviation causes any security or stability issues. Such cases require further manual review to confirm; e.g., IDN table includes an extra code point.</td>
</tr>
<tr>
<td>REVIEW</td>
<td>The tool finds a deviation from the reference LGR which may potentially cause security or stability issues; e.g., IDN table omits a variant mapping present in the reference LGR.</td>
</tr>
</tbody>
</table>
Modifying an IDN Table Based on Detail Analysis

- For “MANUAL CHECK” cases: the IDN table owner should make sure that the deviation does not create any security issues; supporting information should be included in the description section of the IDN table.

- For “REVIEW” cases: the IDN table owner should consider if additional mechanisms should be added to address potential security issues.
Webinar and Demo

- For webinar session and demonstration of the tool please visit the [webinar recording](#).

- The webinar includes:
  - IDN Table and Reference Label Generation Rules (LGRs)
  - IDN Table Review Tool features
  - How to use the IDN Table Review Tool
  - Demo of IDN Table Review Tool
Conclusion

- Link to the IDN Table Review Tool: https://www.icann.org/resources/pages/lgr-toolset-2015-06-21-en

- Link to reference LGRs: https://www.icann.org/resources/pages/second-level-lgr-2015-06-21-en

- This is currently a pilot release, and you are invited to use the tool and share feedback with us, which will lead to further improvements. Please contact IDNProgram@icann.org to report any bugs.

- Please remember: The IDN table review function of the LGR tool compares IDN tables with reference label generation rulesets. The purpose of this report is to assist the user in identifying potential issues that exist in IDN tables. The IDN Table Review Tool report is for information only – it is not a warranty or guarantee of an ICANN IDN table review process.
Appendix A: Introduction to IDN Tables
What is an IDN Table?

- IDN tables define the labels that can be registered for a particular language or script under a top-level domain (TLD).
  - IDN tables help manage the security, stability, and usability of IDNs.

- IDN tables include Unicode code points, variants, and linguistic and technical rules to determine appropriate and secure domain labels.
  - Repertoire: \{U+0061 - U+007A, U+0030 - U+0039, U+002D\}; a-z, 0-9, -.
  - Variants: U+0629 (ة) and U+06C3 (ة) are variants in Arabic script.
  - Rules:
    - Linguistic: A tone mark follows the main consonant in the Lao script.
    - Technical: The Unicode string MUST NOT contain a hyphen in the third-and fourth-character positions as per RFC 5891.

- IDN tables can be defined in multiple formats:
  - Latest machine-readable XML format specified in RFC 7940.
    - RFC 7940 refers to IDN tables as Label Generation Rules (LGRs).
  - Previously, text-based formats in RFC 3743 and RFC 4290 were also used.
Repertoire is a subset of possible code points based on IDNA2008.
Variant Labels

Variant labels are generated by code point (or sequence of code points) that could be substituted for a code point (or sequence of code points) that is considered the “same” in some measure by a given community of Internet users. They can be defined for Security and/or Usability.
Rules

- **Linguistic:** A tone mark follows the main consonant in the Lao script.
  
  ![Example](image)

  - rendered as ມ້
  
- **Technical:** The Unicode string MUST NOT contain a hyphen in the third- and fourth-character positions as per RFC 5891.
  
  - niña-café ✓
  
  - ni--ñacafé X
IDN tables include a Repertoire, Variant Mappings, and Rules.

**IDN Table**

- Code Point Repertoire
- Variant Mappings
- Rules

IDN tables can be defined in multiple formats:
- Latest machine-readable XML format specified in RFC 7940.
  - RFC 7940 refers to IDN tables as Label Generation Rules (LGRs).
- Previously, text-based formats in RFC 3743 and RFC 4290 were also used.
<lgr xmlns="urn:ietf:params:xml:ns:lgr-1.0">
  <meta>
    <version comment="Second Level Reference LGR">3</version>
    <date>2020-05-31</date>
  </meta>
  <description type="text/html">
    ...</description>
  <references ...
  </references>
</lgr>

<rule name="follows-consonant-robat-shifter" comment="WLE Rule 5: makes sure that dependent vowel follows a consonant or a shifter or a robat">
  <look-behind>
    <choice>
      <class by-ref="shifter"/>
      <class by-ref="consonant"/>
      <class by-ref="robat"/>
    </choice>
  </look-behind>
</rule>
IDN Table Example in Text Format (RFC 4290)

---

# Info

# Registry: Verisign Inc.
# Contact: Registry Customer Service
# Email: info@verisign-grs.com
# Phone: +1-703-925-6399
# Script: Khmer (kmr)
# Version: 2.9
# Date: March 21st, 2017
# Unicode: 6.6.0

# Applicable Rules

# Code points: U+002D (HYPHEN-MINUS)
# Reference: RFC 5891 4.2.3.1
# Rules: Cannot begin or end a label
# Cannot occupy 3rd and 4th position

# Code points: U+1786..U+17D3, U+17DD (COMBINING MARKS)
# Reference: RFC 5891 4.2.3.2
# Rules: Cannot begin a label

# Code points: U+17D7 (MODIFIER LETTERS)
# Reference: Predelegation Tester Request
# Rules: Cannot begin a label

# Points

U+002D  # Common  HYPHEN-MINUS
U+0030  # Common  DIGIT ZERO
U+0031  # Common  DIGIT ONE
U+0032  # Common  DIGIT TWO
U+0033  # Common  DIGIT THREE
U+0034  # Common  DIGIT FOUR
U+0035  # Common  DIGIT FIVE
U+0036  # Common  DIGIT SIX
U+0037  # Common  DIGIT SEVEN
U+0038  # Common  DIGIT EIGHT
U+0039  # Common  DIGIT NINE
U+1780  # Khmer  KHMER LETTER KA
U+1781  # Khmer  KHMER LETTER KHA
U+1782  # Khmer  KHMER LETTER KO
U+1783  # Khmer  KHMER LETTER KHO
U+1784  # Khmer  KHMER LETTER NGO
U+1785  # Khmer  KHMER LETTER CA
U+1786  # Khmer  KHMER LETTER CHA
U+1787  # Khmer  KHMER LETTER CO
U+1788  # Khmer  KHMER LETTER CHO
U+1789  # Khmer  KHMER LETTER NYO
U+178A  # Khmer  KHMER LETTER DA
U+178B  # Khmer  KHMER LETTER THYA
U+178C  # Khmer  KHMER LETTER DO
U+178D  # Khmer  KHMER LETTER TTHO
U+178E  # Khmer  KHMER LETTER NNO
U+178F  # Khmer  KHMER LETTER TA
U+1790  # Khmer  KHMER LETTER THA
U+1791  # Khmer  KHMER LETTER TO
U+1792  # Khmer  KHMER LETTER TTO
U+1793  # Khmer  KHMER LETTER NO
U+1794  # Khmer  KHMER LETTER BA
U+1795  # Khmer  KHMER LETTER PHA
U+1796  # Khmer  KHMER LETTER PO
U+1797  # Khmer  KHMER LETTER PRO
U+1798  # Khmer  KHMER LETTER MO
U+1799  # Khmer  KHMER LETTER YO
U+179A  # Khmer  KHMER LETTER RO
U+179B  # Khmer  KHMER LETTER LO
U+179C  # Khmer  KHMER LETTER VO
U+179D  # Khmer  KHMER LETTER SHA
U+179E  # Khmer  KHMER LETTER SSO
U+179F  # Khmer  KHMER LETTER SA
U+17A0  # Khmer  KHMER LETTER HA
U+17A1  # Khmer  KHMER LETTER LA
U+17A2  # Khmer  KHMER LETTER QA
U+17A3  # Khmer  KHMER INDEPENDENT VOWEL OQO
U+17A4  # Khmer  KHMER INDEPENDENT VOWEL QAQ
U+17A5  # Khmer  KHMER INDEPENDENT VOWEL QI
U+17A6  # Khmer  KHMER INDEPENDENT VOWEL QII
U+17A7  # Khmer  KHMER INDEPENDENT VOWEL QU
U+17A8  # Khmer  KHMER INDEPENDENT VOWEL QUK
U+17A9  # Khmer  KHMER INDEPENDENT VOWEL QUU
U+17AA  # Khmer  KHMER INDEPENDENT VOWEL QUV
U+17AB  # Khmer  KHMER INDEPENDENT VOWEL RY
U+17AC  # Khmer  KHMER INDEPENDENT VOWEL RYY
U+17AD  # Khmer  KHMER INDEPENDENT VOWEL LY
U+17AE  # Khmer  KHMER INDEPENDENT VOWEL LYY
U+17AF  # Khmer  KHMER INDEPENDENT VOWEL QE
U+17B0  # Khmer  KHMER INDEPENDENT VOWEL QAI
U+17B1  # Khmer  KHMER INDEPENDENT VOWEL QOO TYPE ONE
U+17B2  # Khmer  KHMER INDEPENDENT VOWEL QOO TYPE TWO
U+17B3  # Khmer  KHMER INDEPENDENT VOWEL QAO
U+17B4  # Khmer  KHMER VOWEL SIGN AA
U+17B5  # Khmer  KHMER VOWEL SIGN I
U+17B6  # Khmer  KHMER VOWEL SIGN II
U+17B7  # Khmer  KHMER VOWEL SIGN Y
U+17B8  # Khmer  KHMER VOWEL SIGN YY
U+17B9  # Khmer  KHMER VOWEL SIGN U
U+17BA  # Khmer  KHMER VOWEL SIGN UU
U+17BB  # Khmer  KHMER VOWEL SIGN A
U+17BC  # Khmer  KHMER VOWEL SIGN AU
U+17BD  # Khmer  KHMER VOWEL SIGN EA
U+17BE  # Khmer  KHMER VOWEL SIGN E
U+17BF  # Khmer  KHMER VOWEL SIGN YA
U+17C0  # Khmer  KHMER VOWEL SIGN IE
U+17C1  # Khmer  KHMER VOWEL SIGN E
U+17C2  # Khmer  KHMER VOWEL SIGN AE
U+17C3  # Khmer  KHMER VOWEL SIGN AI
U+17C4  # Khmer  KHMER VOWEL SIGN AO
U+17C5  # Khmer  KHMER VOWEL SIGN AU
U+17C6  # Khmer  KHMER SIGN NIKAHIT
U+17C7  # Khmer  KHMER SIGN REAHUK
U+17C8  # Khmer  KHMER SIGN YUKLEAFINTU
U+17C9  # Khmer  KHMER SIGN MUSIKATOAN
U+17CA  # Khmer  KHMER SIGN TRISAP
U+17CB  # Khmer  KHMER SIGN BANTOC
U+17CC  # Khmer  KHMER SIGN ROBAT
U+17CD  # Khmer  KHMER SIGN TOHDAKHIAT
Appendix B:

Introduction to Reference LGRs
Reference LGRs are based on the RZ-LGR, and designed for the second level:
- Formed in consultation with the relevant script community.
- Follow design principles in RFC 6912 and SSAC’s SAC060.
- Developed in machine-readable RFC 7940 format.
- Pre-vetted for security and stability considerations.

Registry operators are encouraged to consult the reference LGRs while they design their own IDN tables. However, strict adherence is not required.

Reference LGRs are used as a baseline for reviewing IDN tables for generic top-level domain (gTLD) registries.

Reference LGRs are published at https://www.icann.org/resources/pages/second-level-lgr-2015-06-21-en
Engage with ICANN – Thank You and Questions

Visit us at icann.org

- @icann
- facebook.com/icannorg
- youtube.com/icannnews
- flickr.com/icann
- linkedin/company/icann
- slideshare/icannpresentations
- soundcloud/icann
- instagram.com/icannorg

One World, One Internet