Introduction to LGR Toolset

- Label Generation Rulesets (LGRs) specify metadata, code point repertoire, variant rules and Whole Label Evaluation (WLE) rules to generate labels.

- RFC 7940 describes how LGR can be specified using XML, a machine readable format.

- LGR can be used to generate domain name labels for use in the internet’s root zone and other levels.

- LGR Toolset can be used to:
  - create an LGR
  - view LGR as an HTML webpage or XML Format
  - merge multiple LGRs into a single LGR
  - validate single label or multiple labels using an LGR
  - determine cross-script variants of labels using a merged LGR
  - manage LGRs by comparing or combining them
  - review possible impact of a new or a revised LGR on existing labels
  - harmonize multiple LGRs
  - compute variants
Availability of LGR Toolset

- LGR Toolset is available with the following disclaimer:

  This software is provided by ICANN and contributors `as is` and any express or implied warranties, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose are disclaimed. In no event shall ICANN or contributors be liable for any direct, indirect, incidental, special, exemplary, or consequential damages (including, but not limited to, procurement of substitute goods or services; loss of use, data, or profits; or business interruption) however caused and on any theory of liability, whether in contract, strict liability, or tort (including negligence or otherwise) arising in any way out of the use of this software, even if advised of the possibility of such damage.

- Online deployment
  
  Visit https://lgrtool.icann.org/

- Open source package(s) release with BSD license
  
  Released at github: lgr-core, lgr-django, munidata, picu

- For queries or feedback
  
  Email to IDNProgram@icann.org

- For further details, visit the LGR Toolset webpage or www.icann.org/idn
Agenda

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2. Validate label(s) against an LGR
   (pp. 13-19)

3. Advanced LGR Tools
   (pp. 20-21)

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   (pp. 22-25)

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Viewing cross-script variants of labels
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15
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(pp. 109-112)

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Agenda Details

- **Landing Page**
  - Validate Label Mode - Validate label(s) against an LGR
  - Review Mode - Review IDN table(s)
  - Advanced LGR Tools

- **Validate label(s) against an LGR**
  - Validate label against RZ-LGR
  - View LGR as XML and HTML
  - Validate a single label or list of label(s)
  - Check label(s) for collision with existing TLD

- **Advanced LGR Tools**
- **Import or Load LGR**
  - Import LGR
  - Select LGR with validating repertoire
- **Import Multiple LGRs**
  - Import LGR
  - Select multiple LGRs with validating repertoire
  - Specify name of the merged LGR
Agenda Details (cont.)

- **Create LGR**
  - Create LGR
  - Enter LGR Details
  - Add Code Points
  - Expand Ranges
  - Add References
  - Define Metadata
  - Define Classes, Rules & Actions
  - Define Code Point Properties
  - Download LGR

- **Validate LGR**

- **View LGR as XML and HTML**

- **Validate a label**
  - Validate a label using a single LGR
  - Validate a label using a merged LGR
Agenda Details (cont.)

- **Review Impact on Existing Labels by Revising an Existing LGR**
  - Select “Diff labels of two LGRs”
  - Enter Details
  - Email Notification
  - Download Results

- **Review Impact on Existing Labels by Introducing a New LGR**
  - Select “Get collisions in a list of labels”
  - Enter Details
  - Email Notification
  - Download Results

- **Validate Multiple Labels using a single or a merged LGR**
  - Select “Generate disp. annotations”
  - Enter Details
  - Email Notification
  - Download Results
Agenda Details (cont.)

- **View Cross-script Variants of Labels**
  - Select “Cross-script variants”
  - Enter Details
  - Email Notification
  - Download Results

- **Compare LGRs**
  - Compare LGRs
  - Select Union, Intersection or Difference
  - With merged LGRs, “Diff” chosen by default

- **Harmonize multiple LGRs**
  - Select “Harmonization”
  - Enter Details
  - Email Notification
  - Download Results

- **Computing variants**
  - Select “Compute Variants”
  - Select relevant LGR
  - Upload list of labels and enter email
  - Download results on email notification
Landing Page

Agenda Item #1
Welcome to the LGR (Label Generation Ruleset) Tools

Select your mode:

- ✔ Validate label(s) against an LGR
- 📜 Review IDN table(s)

Advanced LGR Tools

If you have questions, please contact globalsupport@icann.org
Validate label(s) against an LGR

Agenda Item #2
Validate label(s) against an LGR

Label Validation Tool

Validate label(s) against

lgr-5-common-26may22-en.xml

View LGR as XML | HTML

Upload a list of labels

Label

☐ Check for collision with existing TLDs

☐ Include mixed script variants

Validate
Validate label(s) against an LGR

1. Select required version of RZ-LGR
2. View RZ-LGR version as XML or HTML
3. Two ways to upload label(s)
   3.a. Enter a single label or multiple labels manually
   3.b. Upload a list of labels

Validate label(s) against

Upload a list of labels

Check for collision with
Include mixed script variants

Validate
Validate label(s) against an LGR (Manual Entry of label)

Label Validation Tool

Validate label(s) against

View LGR as XML | HTML

1. Enter label here

2. To add or remove new label

3. Check if label entered collides with existing TLDs

4. Check if mixed script variants needed

5. Press “Validate” to get results
Validate label(s) against an LGR (Manual Entry of label)

Label Validation Tool

Validate label(s) against: lgr-5-common-26may22-en.xml

View LGR as XML | HTML

Upload a list of labels

- هرون

- Check for collision with existing TLDs
- Include mixed script variants

Validate

VALID

<table>
<thead>
<tr>
<th>U-label</th>
<th>Disposition</th>
<th>Code point sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>هرون</td>
<td>valid</td>
<td>U+0647 (۰) U+0627 (۱) U+0631 (۲) (۳) U+0648 (۴) U+0646 (۵)</td>
</tr>
</tbody>
</table>

[Action index: 51] <action disp="valid" ref="100" comment="catch all (default action) @"/>
5. To go back to manual entry of labels

1. Upload file encoded in UTF-8 and using Unix line ending

2. Check if file entered collides with existing TLDs

3. Check if want to enable mixed script variants

4. Press “Validate” to get results
Validate label(s) against an LGR (Upload list of label)

**Label Validation Tool**

**Validate label(s) against**

- lgr-5-common-26may22-en.xml

View LGR as XML | HTML

- Manually input label(s)

- Choose File
  - No file chosen

File must be encoded in UTF-8 and using 0x0A line ending.

- Check for collision with existing TLDs
- Include mixed script variants

1. Results and status of list of labels will be present on the Task Status Page

Your request was sent successfully, the validation task processing can take minutes, even hours.
You can follow your task progression on the task status page.
Validate label(s) against an LGR (Upload list of label)

1. Status bar shows the status of task

2. Press Download Report to download Report of Task
Advanced LGR Tools

Agenda Item #3
Advanced LGR Tools

Advanced LGR (Label Generation Ruleset) Tools

This application provides a convenient interface for browsing and editing LGRs conforming to the Representing Label Generation Rulesets using XML specification.

Previously loaded LGR file(s)
No LGR has been previously loaded.

Create a new LGR file or import an existing one

⚠️ Note that importing large LGR files may take significant time to load on your browser.

Start from a built-in LGR
The following LGRs are pre-installed in the system. You may use them as a starting point for your own LGR. To do so, just click on it to make a copy that you can then edit.

- Open Sample-French
- Open RZ-LGR 1
- Open RZ-LGR 2
- Open RZ-LGR 3
- Open RZ-LGR 4
- Open RZ-LGR 5

Remember to save your work regularly by downloading a copy of the XML file.

Please send any feedback to support@viagenie.ca.

Your saved results
The following files contains your tools computation results.

⚠️ Note that these files could be cleaned up regularly.

- Download 20221022_171249_annotation_RZ-LGR_5.txt.gz

| 22 |
Import or Load LGR

Agenda Item #4
Import or Load LGR

To start by using an existing LGR file in XML format, click on the “Import” button.
Select LGR with Validating Repertoire

1. To import or load an existing LGR in XML format, click on “Choose Files”

2. Choose the “Validating repertoire” from the given options

3. Click on the “Import” button
The screen looks like this after successful import of existing LGR file in XML format.
Import Multiple LGRs

Agenda Item #5
Import or Load LGRs

To start by using existing LGR files in XML format, click on the “Import” button.
Select LGRs with Validating Repertoire

1. To import or load multiple LGRs in XML format, click on “Choose Files” and select multiple files.

2. Choose the “Validating repertoire” from the given options.

3. Enter a name for the set of LGRs.

4. Click on the “Import” button.
### Imported LGRs As a Merged LGR

The screen looks like this after successful import of multiple LGR files in XML format:

<table>
<thead>
<tr>
<th>Code point</th>
<th>Character Name</th>
<th>Tags</th>
<th>Comments</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+0067 (g)</td>
<td>LATIN SMALL LETTER G</td>
<td>Latin</td>
<td>Cross-script homoglyph</td>
<td>See code point</td>
</tr>
<tr>
<td>U+0068 (h)</td>
<td>LATIN SMALL LETTER H</td>
<td>Latin</td>
<td>Cross-script homoglyph</td>
<td>See code point</td>
</tr>
<tr>
<td>U+006E (n)</td>
<td>LATIN SMALL LETTER N</td>
<td>Latin</td>
<td>Cross-script homoglyph</td>
<td>See code point</td>
</tr>
<tr>
<td>U+006F (o)</td>
<td>LATIN SMALL LETTER O</td>
<td>Latin</td>
<td>Cross-script homoglyph</td>
<td>See code point</td>
</tr>
<tr>
<td>U+0071 (q)</td>
<td>LATIN SMALL LETTER Q</td>
<td>Latin</td>
<td>Cross-script homoglyph</td>
<td>See code point</td>
</tr>
<tr>
<td>U+0075 (u)</td>
<td>LATIN SMALL LETTER U</td>
<td>Latin</td>
<td>Cross-script homoglyph</td>
<td>See code point</td>
</tr>
<tr>
<td>U+0269 (i)</td>
<td>LATIN SMALL LETTER IOTA</td>
<td>Latin</td>
<td>Cross-script homoglyph</td>
<td>See code point</td>
</tr>
<tr>
<td>U+03B7 (n)</td>
<td>GREEK SMALL LETTER ETA</td>
<td>Greek</td>
<td>Cross-script homoglyph</td>
<td>See code point</td>
</tr>
<tr>
<td>U+03B9 (i)</td>
<td>GREEK SMALL LETTER IOTA</td>
<td>Greek</td>
<td>Cross-script homoglyph</td>
<td>See code point</td>
</tr>
</tbody>
</table>
Create an LGR
Agenda Item #6
Create an LGR

To start by creating an LGR file in XML format, click on the “New” button.

Previously loaded LGR file(s)
No LGR has been previously loaded.

Create a new LGR file or import an existing one

- Import an existing XML file

⚠️ Note that importing large LGR files may take significant time to load on your browser.

- Start with a New blank XML file
Enter LGR Details

1. Write name for the LGR being created

2. Select Validating repertoire from the given options for the “New” LGR. MSR for RZ-LGR and IDNA version for second level LGRs

3. Click on the “Create” button
Click on “Add code points” to add code points to the newly created LGR.
To add code points, there are four different ways:

1. Add code points one by one
2. Add code points by giving a range
3. Add code points by specifying a script
4. Add code points from a file
Add Code Points

1. Write the code point to be added. The code point value or the actual character can be entered

2. Click on the “Add Code Point” button
Add Code Points

1. Add the first code point of the range

2. Add the last code point of the range

3. Click on “Next” button

Either code point value or the character can be added.
Add Code Points

1. Select a script from the given options
2. Select Validating Repertoire from the given options
3. “Manual import” is optional – allows checking each code point in the script before adding to the LGR
4. Click on “Next” button
Add Code Points

1. Select the file containing code points
2. Select the file type from the given options
3. “Manual import” is optional – allows checking each code point in the file before adding to the LGR
4. Click on the “Next” button
### Expand Ranges

To expand all the code points in all the ranges of the LGR, click on “Expand range(s)”.

To expand all the code points in this range, click on “Expand range”.

<table>
<thead>
<tr>
<th>Code point</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+1780 (ฎ) 0 Variant(s)</td>
<td>KHMER LETTER KA</td>
</tr>
<tr>
<td>U+1781 (ក) ... U+1784 (ក)</td>
<td>KHMER LETTER KHA ... KHMER LETTER NGO</td>
</tr>
<tr>
<td>U+1787 (_qos) 0 Variant(s)</td>
<td>KHMER LETTER CO</td>
</tr>
<tr>
<td>U+1788 (__) 0 Variant(s)</td>
<td>KHMER LETTER CHO</td>
</tr>
<tr>
<td>U+1789 (လ) 0 Variant(s)</td>
<td>KHMER LETTER NYO</td>
</tr>
<tr>
<td>U+178A (ฐ) 0 Variant(s)</td>
<td>KHMER LETTER DA</td>
</tr>
<tr>
<td>U+178B (ฏ) 0 Variant(s)</td>
<td>KHMER LETTER TTHA</td>
</tr>
<tr>
<td>U+178D (ួ) 0 Variant(s)</td>
<td>KHMER LETTER TTHO</td>
</tr>
</tbody>
</table>
Add References

1. Add Reference id
2. Add comments
3. Add detailed reference
4. Click on the “Add” button

Click on “References” tab to add references to the LGR
Add References

“Existing references” tab shows the added references

<table>
<thead>
<tr>
<th>Reference id</th>
<th>Description</th>
<th>URL</th>
</tr>
</thead>
</table>

New reference

<table>
<thead>
<tr>
<th>Reference id</th>
<th>Description</th>
<th>URL</th>
</tr>
</thead>
</table>
Define Meta Data

Click on “Meta data” tab to add meta information about the LGR.

<table>
<thead>
<tr>
<th>Code points</th>
<th>References</th>
<th>Meta data</th>
<th>Tags</th>
<th>Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Version comment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td></td>
<td>2018-08-08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td></td>
<td>und-Khmer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td>example</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope type</td>
<td></td>
<td>domain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Validity start</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Validity end</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unicode version</td>
<td></td>
<td>10.0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Define Meta Data

Select "Description type" from the given options

Add any text for describing the LGR

Select "Validating repertoire" from the given options

After filling every detail, click on the "Save" button
Click on “Tags” tab to view all tag names and associated code points

<table>
<thead>
<tr>
<th>Tag name</th>
<th>Associated code points</th>
</tr>
</thead>
<tbody>
<tr>
<td>vowel</td>
<td>U+17A7 (8)</td>
</tr>
<tr>
<td>consonant</td>
<td>U+1781 (8) U+1782 (8) U+1783 (8) U+1784 (8) U+1787 (8)</td>
</tr>
</tbody>
</table>

To create a new tag: Add it to a code point first to find it back in this list.
Define Classes, Rules & Actions

Click on “Rules” tab to add certain rules to the LGR

Click on “New class” button to add classes to the LGR

Click on “New rule” button to add rules to the LGR

Click on “New action” button to add actions to the LGR
Define Classes

1. Add classes in the relevant box

2. Click on the “Save” button
Define Rules

1. Add the rule in the relevant box
2. Click on the “Save” button
Define Actions

1. Add action in the relevant box

2. Click on the “Save” button

```
<rule name="follows-consonant" comment="WLE Rule No. 8: checks if sign code point or subscript consonant follows a consonant">
  <look-behind>
    <class by-ref="consonant" />
  </look-behind>
  <anchor />
</rule>

<action disp="blocked" any-variant="blocked" />
```
Apply Batch Action

1. Select multiple code points to apply the batch action

2. Select the type of batch action
Apply Batch Action – Add WLE

1. Add when-rule / not-when-rule from the list of WLE rules

2. Click on “Next” button
Apply Batch Action – Add Tags

1. Type new tags, separate by a space, or select the existing ones
2. Click on “Next” button
Define Code Point Properties

Click on the “See code point” button to add code point details/properties
Define Code Point Properties - 1

1. Add variant for the code point

2. Click on the “Add variant button”

3. Add details for the added variant – type, comments, when-rule and not-when rule

4. Add tags for the code point

5. Add when-rule/not-when rule from the list of rules it provides

6. Add any description for the code point
Define Code Point Properties - 2

7. Click on “Save variants, tags, context rules and comment” button

8. Click on the “Edit” button to add references to the code point

To delete code point & its details, click on the “Delete code point” button

Note: If the added code point is not in the repertoire, the system will automatically add the out-of-repertoire mapping.
Define Code Point Properties - 3

The screen looks like this after successfully defining code point properties.

If the variant definitions are not symmetric, this button will show up. Click “Populate variants” to automatically populate variant mappings.
Download LGR

Click on “Output” and select “Download” from the given options to download the created LGR.
Validate LGR

Agenda Item #7
Click on “Validate LGR” button to validate LGR and get a summary of the entire LGR. It is important to note that this function should be used for checking an LGR before use, e.g. when it is created or imported.
Validate LGR

Summary of checks performed, including symmetry and transitivity
Validate LGR

Second half of the “Validate LGR” output

Summarized LGR

- **Generate stats**
  - **General stats**
    - Number of code points: 113
    - Number of ranges: 5
    - Largest range: U+076E (g) ... U+0771 (圉) (length: 4)
    - Number of sequences: 0
  - **Variants**
    - Total number of variant mappings: 192
    - Average number of variants per code point: 3.6
    - Variants per type:
      - Number of variants for type allocatable: 26
      - Number of variants for type blocked: 166
  - **Tags**
    - Number of code points for tag sc:Arab: 113
  - **Rules**
    - Number of defined rules: 17
View LGR as XML and HTML

Agenda Item #8
Click on “Output” and select “View XML” from the given options to get an XML view of the LGR.
This XML file does not appear to have any style information associated with it. The document tree is shown below.

```xml
<lg xmlns="urn:ietf:params:xml:ns:1gr-1.0">
  <meta>
    <version comment="Thai Script Root Zone LGR Version 6.9">2</version>
    <date>2017-05-25</date>
    <unicode-version>6.3.0</unicode-version>
    <language>und-Thai</language>
    <scope type="domain"> </scope>
  </meta>
  <![CDATA[
    <h1>Label Generation Rules for the Thai Script</h1>
    <h2>Overview</h2>
    <p>This file contains Label Generation Rules (LGR) for the Thai script as would be appropriate for the Root zone. For more details on this LGR see "Proposal for a Thai Script Root Zone LGR [Proposal]"</p>
    <h2>Repertoire</h2>

    2> <p>In addition to the 68 code points according to Section 5 “Repertoire” in [Proposal], three sequences have been defined. The sequence U0E4D U0E32 was defined to replace the disallowed U0E33 (THAI CHARACTER SARA AM) and to facilitate implementation of WLE rule <b>follows-consonant-tone</b> as a context rule. The other two sequences were defined to restrict U0E45 (THAI CHARACTER LAKKHANGYAO) from appearing in any context other than these sequences. Accordingly, while U0E45 is not listed by itself it brings the total of distinct code points to 69.</p>
    <h2>Variants</h2>
    <p>According to Section 6 "Variants", in "[Proposal]", this LGR defines no variants.</p>
    <h2>Character Classes</h2>
    <p>The Thai Script is an abugida in which consonant-vowel sequences are written as a unit: each unit is based on a consonant letter, and vowel, tone mark or diacritic notation are secondary. It is written with the combining marks stacked above or below the base consonant, like diacritics in European languages. However, although the concepts are quite similar, the implementations are significantly different.</p>
    <p>There are 44 characters that are classified as consonants, code points from this subset have been given the tag "cons".</p>
    <p>The 18 vowel symbols pronounced after a consonant are non-sequential: they can be located before (lv), after (fv), above (av) or below (bv) the consonant, or in a combination of these positions, code points from this subset have been given the tag "fv1", "fv2", "fv3", "av", "bv", "lv". There are three code point sequences defined that include vowels. (Code point sequences do not carry tag values; instead, for code point sequences the subset values are indentified in comments).</p>
    <p>There are 5 phonemic tones: mid, low, falling, high, and rising. These 5 tones are represented by 4 tone marks plus the absence of a mark. Code points from this subset have been given the tag "tone".</p>
    <p>There are 3 diacritic symbols that have been included here and given the tag "ad". They differ in their frequency and purpose of usage. See also the discussion in section 5.4 in [Proposal].</p>
  ]]>
</lg>
```
Click on “Output” and select “HTML Output” from the given options to view the HTML output of the LGR.
Meta data in LGR

<table>
<thead>
<tr>
<th>Meta data in LGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGR Version</td>
</tr>
<tr>
<td>Date</td>
</tr>
<tr>
<td>Language(s)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Scope(s)</td>
</tr>
<tr>
<td>Unicode Version</td>
</tr>
</tbody>
</table>

This document is mechanically formatted from the XML file for the LGR. It provides additional summary data and explanatory text. The XML file remains the sole normative specification of the LGR.

Table of Contents

1 Description
2 Repertoire
3 Variant Sets
4 Classes, Rules and Actions
   4.1 Character Classes
   4.2 Whole label evaluation and context rules
   4.3 Actions
5 Table of References

Description
Label Generation Rules for the Thai Script

Overview

This file contains Label Generation Rules (LGR) for the Thai script as would be appropriate for the Root zone. For more details on this LGR see "Proposal for a Thai Script Root Zone LGR [Proposal]."

Repertoire

In addition to the 68 code points according to Section 5 “Repertoire” in [Proposal], three sequences have been defined. The sequence U+0E4D U+0E32 was defined to replace the disallowed U+0E33 (THAI CHARACTER SARA AM) and to facilitate implementation of WLE rule follows-consonant-tone as a context rule. The other two sequences were defined to restrict U+0E45 (THAI CHARACTER LAKKHANGYO) from appearing in any context other than these sequences. Accordingly, while U+0E45 is not listed by itself it brings the total of distinct code points to 69.

Variants

According to Section 6 "Variants", in "[Proposal]", this LGR defines no variants.

Character Classes

The Thai Script is an abugida in which consonant–vowel sequences are written as a unit: each unit is based on a consonant letter, and vowel, tone mark or diacritic notation are secondary. It is written with the combining marks stacked above or below the base consonant, like diacritics in European languages. However, although the concepts are quite similar, the implementations are significantly different.

There are 44 characters that are classified as consonants, code points from this subset have been given the tag "cons".

The 18 vowel symbols pronounced after a consonant are non-sequential: they can be located before (lv), after (fv), above (av) or below (bv) the consonant, or in a combination of these positions, code points from this subset have been given the tag "fv1", "fv2", "fv3", "av", "bv", "lv". There are three code point sequences defined that include vowels. (Code point sequences do not carry tag values; instead, for code point sequences the subset values are identified in comments).

There are 5 phonemic tones: mid, low, falling, high, and rising. These 5 tones are represented by 4 tone marks plus the absence of a mark. Code
Repertoire

Summary

- Number of elements in repertoire: 434
- Number of ranges in repertoire: 0
- Number of code point sequences: 4

Repertoire by Code Point

The following table lists the repertoire by code point (or code point sequence). The data in the Script and Name column are extracted from the Unicode character database. Where the comment in the original LGR is equal to the character name, it has been suppressed.

For any code point or sequence for which a variant is defined, the link to the associated variant set, or if mapped to itself, the variant type of that mapping is provided in the Variants column.

<table>
<thead>
<tr>
<th>#</th>
<th>Code Point</th>
<th>Glyph</th>
<th>Script</th>
<th>Name</th>
<th>Tags</th>
<th>Required Context</th>
<th>Variants</th>
<th>Comment</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>U+0E01</td>
<td>น</td>
<td>Thai</td>
<td>THAI CHARACTER KO KAI</td>
<td>Thai, und-Thai-cons</td>
<td></td>
<td></td>
<td></td>
<td>[5], [100], [101]</td>
</tr>
<tr>
<td>2</td>
<td>U+0E02</td>
<td>ช</td>
<td>Thai</td>
<td>THAI CHARACTER KHO KHAI</td>
<td>Thai, und-Thai-cons</td>
<td></td>
<td></td>
<td></td>
<td>[5], [100], [101]</td>
</tr>
<tr>
<td>3</td>
<td>U+0E03</td>
<td>ช</td>
<td>Thai</td>
<td>THAI CHARACTER KHO KHUAT</td>
<td>Thai, und-Thai-cons</td>
<td></td>
<td></td>
<td></td>
<td>[5], [100], [101]</td>
</tr>
<tr>
<td>4</td>
<td>U+0E04</td>
<td>น</td>
<td>Thai</td>
<td>THAI CHARACTER KHO KHWAI</td>
<td>Thai, und-Thai-cons</td>
<td></td>
<td></td>
<td></td>
<td>[5], [100], [101]</td>
</tr>
</tbody>
</table>
### Variant Sets

#### Summary

<table>
<thead>
<tr>
<th>Number of variant sets</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Largest variant set</td>
<td>4</td>
</tr>
<tr>
<td>Ordinary Variants by Type</td>
<td>blocked (98)</td>
</tr>
</tbody>
</table>

The following tables list all variant sets defined in this LGR, except for singleton sets. Each table lists all variant mapping pairs of the set; one per row. Mappings are assumed to be symmetric: each row documents both forward (→) and reverse (←) mapping directions. In each table, the mappings are sorted by Source value in ascending code point order; shading is used to group mappings from the same source code point or sequence.

Where the type of both forward and reverse mappings are the same, a single value is given in the Type(s) column, otherwise the types for forward and reverse mappings, as well as comments and references are listed above one another.

A mapping where source and target are the same is reflexive. Variant sets consisting of only a single reflexive mapping are not shown as a set. Instead, the variant type of the mapping is listed in the Variants column of the Repertoire by Code Point table. Reflexive mappings that are part of a larger set are indicated with a "*".

In any LGR with variant specifications that are well behaved, all members within each variant set are defined as variants of each other; the mappings in each set are symmetric and transitive; and all variant sets are disjoint.

#### Common Legend

- **Source**: Source of the mapping pair.
- **Target**: Destination of the mapping pair.
- **Glyph**: The shape displayed for source or target depends on the fonts available to your browser.
- **→**: forward: Indicates that variant Type, References and Comment apply to the mapping from source to target.
- **←**: reverse: Indicates that variant Type, References and Comment apply to the reverse mapping from target to source.
- **↔**: both: Indicates that variant Type, References and Comment apply to both forward and reverse mapping.
- **≡**: reflexive: Indicates that variant Type, References and Comment are for a reflexive mapping where source equals target.
- **☐**: not in LGR: Indicates that variant is not in LGR.

- **Type**: The type of the variant mapping. There are some predefined variant types such as "allocatable" and "blocked", while others are defined specifically for each LGR.
- **References**: One or more reference IDs (optional). A "/" separates references for reverse / forward mappings, if different.
- **Comment**: A descriptive comment (optional). A "/" separates comments for reverse / forward mappings, if different.

#### Variant Set 1 — 3 Members - 3 Mappings

<table>
<thead>
<tr>
<th>#</th>
<th>Source</th>
<th>Glyph</th>
<th>Target</th>
<th>Glyph</th>
<th>Type(s)</th>
<th>References</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>U+1200</td>
<td>ẑ</td>
<td>U+1210</td>
<td>ṣ</td>
<td>↔ blocked</td>
<td>[4]</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>U+1200</td>
<td>ẑ</td>
<td>U+1280</td>
<td>ḡ</td>
<td>↔ blocked</td>
<td>[4]</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>U+1210</td>
<td>ᵏ</td>
<td>U+1280</td>
<td>ḡ</td>
<td>↔ blocked</td>
<td>[4]</td>
<td></td>
</tr>
</tbody>
</table>
# HTML Output - Classes

## Classes, Rules and Actions

### Character Classes

The following table lists all top-level classes with their definition and the regular expression defining their members.

<table>
<thead>
<tr>
<th>Name</th>
<th>Definition</th>
<th>Count</th>
<th>Members</th>
<th>References</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>und-Lao-Cf</td>
<td>Tag= und-Lao-Cf</td>
<td>14</td>
<td>{U+0E81 U+0E87 U+0E8A U+0E8D U+0E94 U+0E97 U+0E99 U+0E9A U+0E9F U+0EA1 U+0EA5 U+0EA7 U+0EAA}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>und-Lao-consonant</td>
<td>Tag= und-Lao-consonant</td>
<td>27</td>
<td>{U+0E81 U+0E82 U+0E84 U+0E87 U+0E88 U+0E8A U+0E8D U+0E94 U+0E95 U+0E96 U+0E97 U+0E99 U+0E9A U+0EBB U+0E9C ...}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>und-Lao-semi-consonant</td>
<td>Tag= und-Lao-semi-consonant</td>
<td>1</td>
<td>{U+0E8C}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>und-Lao-tone-mark</td>
<td>Tag= und-Lao-tone-mark</td>
<td>4</td>
<td>{U+0EC8 U+0EC9 U+0ECA U+0ECB}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>und-Lao-vowel-above</td>
<td>Tag= und-Lao-vowel-above</td>
<td>7</td>
<td>{U+0EB1 U+0EB4 U+0EB5 U+0EB6 U+0EB7 U+0EBB U+0ECD}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>und-Lao-vowel-below</td>
<td>Tag= und-Lao-vowel-below</td>
<td>2</td>
<td>{U+0EB8 U+0EB9}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>und-Thai-above-vowel</td>
<td>Tag= und-Thai-av</td>
<td>5</td>
<td>{U+0E31 U+0E34 U+0E35 U+0E36 U+0E37}</td>
<td></td>
<td>Any above vowel</td>
</tr>
<tr>
<td>und-Thai-below-vowel</td>
<td>Tag= und-Thai-bv</td>
<td>2</td>
<td>{U+0E38 U+0E39}</td>
<td></td>
<td>Any below vowel</td>
</tr>
<tr>
<td>und-Thai-c-av-bv</td>
<td>([::und-Thai-consonant::][::und-Thai-above-vowel::][::und-Thai-below-vowel::])</td>
<td>51</td>
<td>{U+0E01 U+0E02 U+0E03 U+0E04 U+0E05 U+0E06 U+0E07 U+0E08 U+0E09 U+0E0A U+0E0B U+0E0C U+0E0D U+0E0E U+0E0F ...}</td>
<td></td>
<td>Any consonant, vowel-above or vowel-below</td>
</tr>
<tr>
<td>und-Thai-consonant</td>
<td>Tag= und-Thai-cons</td>
<td>44</td>
<td>{U+0E01 U+0E02 U+0E03 U+0E04 U+0E05 U+0E06 U+0E07 U+0E08 U+0E09 U+0E0A U+0E0B U+0E0C U+0E0D U+0E0E U+0E0F ...}</td>
<td></td>
<td>Any Consonant</td>
</tr>
<tr>
<td>und-Thai-ct</td>
<td>([::und-Thai-consonant::][::und-Thai-tone::])</td>
<td>48</td>
<td>{U+0E01 U+0E02 U+0E03 U+0E04 U+0E05 U+0E06 U+0E07 U+0E08 U+0E09 U+0E0A U+0E0B U+0E0C U+0E0D U+0E0E U+0E0F ...}</td>
<td></td>
<td>Any consonant or tone</td>
</tr>
<tr>
<td>und-Thai-cta</td>
<td>([::und-Thai-consonant::][::und-Thai-tone::][::::und-Thai-sara-aa::][::::und-Thai-sara-aa::])</td>
<td>49</td>
<td>{U+0E01 U+0E02 U+0E03 U+0E04 U+0E05 U+0E06 U+0E07 U+0E08 U+0E09 U+0E0A U+0E0B U+0E0C U+0E0D U+0E0E U+0E0F ...}</td>
<td></td>
<td>Any consonant, tone or sara-aa</td>
</tr>
<tr>
<td>und-Thai-sara-aa</td>
<td>Tag= und-Thai-sara-aa</td>
<td>1</td>
<td>{U+0E32}</td>
<td></td>
<td>SARA AA</td>
</tr>
<tr>
<td>und-Thai-tone</td>
<td>Tag= und-Thai-tone</td>
<td>4</td>
<td>{U+0E48 U+0E49 U+0E4A U+0E4B}</td>
<td></td>
<td>Any tone mark</td>
</tr>
</tbody>
</table>

---

*ICANN*
### Whole label evaluation and context rules in LGR

The following table lists all the top-level, or named rules defined in the LGR and indicates whether they are used as trigger in an action or as context (when or not-when) for a code point. (Any use of context rules for variants is not indicated.)

<table>
<thead>
<tr>
<th>Name</th>
<th>Regular Expression</th>
<th>Used as Trigger</th>
<th>Used as Context</th>
<th>Anchor</th>
<th>References</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common-leading-combining-mark</td>
<td>(start) ([class property: gc=Mn:]u:[class property: gc=Mc:])</td>
<td>True</td>
<td>False</td>
<td>False</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>und-Laoo-follows-consonant</td>
<td>([und-Laoo-consonant:])*</td>
<td>False</td>
<td>True</td>
<td>True</td>
<td>WLE Rule No. 1; semi-consonant must follow a consonant</td>
<td></td>
</tr>
<tr>
<td>und-Laoo-precedes-consonant</td>
<td>([und-Laoo-consonant:])</td>
<td>False</td>
<td>True</td>
<td>True</td>
<td>WLE Rule No. 2; vowel-before precedes a main consonant cluster</td>
<td></td>
</tr>
<tr>
<td>und-Laoo-follows-main-consonant</td>
<td>(([und-Laoo-consonant:][und-Laoo-semi-consonant:])*</td>
<td>False</td>
<td>True</td>
<td>True</td>
<td>WLE Rule No. 3; vowel-above, and vowel-below follow a main consonant C</td>
<td></td>
</tr>
<tr>
<td>und-Laoo-follows-consonant</td>
<td>(([und-Laao-consonant:][und-Laao-semi-consonant:][und-Laao-tone-mark:][und-Laao-vowel-above:])*</td>
<td>False</td>
<td>True</td>
<td>True</td>
<td>WLE Rule No. 4; vowel-after follows a main consonant, tone-mark or vowel-above</td>
<td></td>
</tr>
<tr>
<td>und-Laao-consonant-cluster</td>
<td>(und-Laao-consonant:)[1,2] (und-Laao-semi-consonant:)[0,1]</td>
<td>False</td>
<td>False</td>
<td>False</td>
<td>Defining consonant cluster for Rule No. 5</td>
<td></td>
</tr>
<tr>
<td>und-Laoo-follows-vbefore-consonant-cluster</td>
<td>(U+0EC0:und-Laoo-consonant-cluster:)</td>
<td>False</td>
<td>True</td>
<td>True</td>
<td>WLE Rule No. 5; The sequence (0EB2 0EB0) follows a vowel before, and a consonant cluster</td>
<td></td>
</tr>
<tr>
<td>und-Laao-follows-C-vabove-vbelow</td>
<td>([und-Laao-consonant:][und-Laao-semi-consonant:][und-Laao-vowel-above:][und-Laao-vowel-below:])*</td>
<td>False</td>
<td>True</td>
<td>True</td>
<td>WLE Rule No. 6; A tone-mark follows a main consonant, vowel-above or vowel-below</td>
<td></td>
</tr>
<tr>
<td>und-Laoo-follows-Cf</td>
<td>([und-Laoo-Cf:])</td>
<td>False</td>
<td>True</td>
<td>True</td>
<td>WLE Rule No. 7; The sign 0ECC can only occur after final consonants</td>
<td></td>
</tr>
<tr>
<td>und-Laoo-repetition-mark-limit</td>
<td>(U+0E60)(0,2)(end))</td>
<td>False</td>
<td>True</td>
<td>True</td>
<td>WLE Rule No. 8; The sign 0E60 can only occur 0 to 3 times at the end of the label</td>
<td></td>
</tr>
<tr>
<td>und-Thai-precedes-consonant</td>
<td>([und-Thai-consonant:])</td>
<td>False</td>
<td>True</td>
<td>True</td>
<td>WLE 7.2: check if current cp is preceding a consonant</td>
<td></td>
</tr>
<tr>
<td>und-Thai-follows-consonant</td>
<td>([und-Thai-consonant:])</td>
<td>False</td>
<td>True</td>
<td>True</td>
<td>WLE 7.3: check if current cp is following a consonant</td>
<td></td>
</tr>
</tbody>
</table>
Actions

The following table lists the actions that are used to assign dispositions to labels and variant labels, based on the specified conditions. The order of actions defines their precedence: the first action triggered by a label is the one defining its disposition.

<table>
<thead>
<tr>
<th>#</th>
<th>Condition</th>
<th>Rule / Variant Set</th>
<th>Disposition</th>
<th>References</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>if label match</td>
<td>Common-leading-combining-mark</td>
<td>invalid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>if at least one variant is in {out-of-repertoire-var}</td>
<td></td>
<td>invalid</td>
<td>any variant label with a code point out of repertoire is invalid</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>if label match</td>
<td>Common-leading-combining-mark</td>
<td>invalid</td>
<td></td>
<td>labels must not commence with a combining mark ()</td>
</tr>
<tr>
<td>4</td>
<td>if at least one variant is in {out-of-repertoire-var}</td>
<td></td>
<td>invalid</td>
<td>any variant label with a code point out of repertoire is invalid ()</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>if label match</td>
<td>Common-leading-combining-mark</td>
<td>invalid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>if at least one variant is in {out-of-repertoire-var}</td>
<td></td>
<td>invalid</td>
<td>any variant label with a code point out of repertoire is invalid</td>
<td></td>
</tr>
</tbody>
</table>

Legend

(...)-variant type set: In the "Rule/Variant Set" column the notation {...} means a set of variant types.

Table of References

- [0] The Unicode Standard 1.1, The Unicode Consortium, Mountain View, CA. 1993

  Ethiopic Script Versions for the Eight Languages

- [2] Corpus Analysis performed by crawling 598 html and 40 PDF files with Tigrigna Contents published online, August 2016
  Cited as Auxiliary Evidence for Tigrigna Code Points

- [3] Corpus Analysis performed by crawling 14,850 html Amharic Contents of size 1.8 GB published online, August 2016
  Cited as Auxiliary Evidence for Amharic Code Points

  Cited for Amharic-Driven Variants in Ethiopic Script

- [5] The Unicode Standard 1.1


# Table of References

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[0]</td>
<td>The Unicode Standard 1.1, The Unicode Consortium, Mountain View, CA. 1993</td>
</tr>
<tr>
<td>[2]</td>
<td>Corpus Analysis performed by crawling 598 html and 40 PDF files with Tigrigna Contents published online, August 2016. Cited as Auxiliary Evidence for Tigrigna Code Points</td>
</tr>
<tr>
<td>[3]</td>
<td>Corpus Analysis performed by crawling 14,850 html Amharic Contents of size 1.8 GB published online, August 2016. Cited as Auxiliary Evidence for Amharic Code Points</td>
</tr>
<tr>
<td>[5]</td>
<td>The Unicode Standard 1.1</td>
</tr>
<tr>
<td>[201]</td>
<td>Lao grammar book published by the Ministry of Education in 1967, see Appendix B, Figure 1</td>
</tr>
<tr>
<td>[202]</td>
<td>Lao grammar book published by the Ministry of Education in 1967, see Appendix B, Figure 2</td>
</tr>
<tr>
<td>[203]</td>
<td>Lao grammar book published by the Ministry of Education in 1967, see Appendix B, Figure 3</td>
</tr>
</tbody>
</table>
Validate a Label

Agenda Item #9
Validate a Label

1. Click on “Import” to load single or multiple existing LGR files. See “Import” for details.

2. Always view “Validate LGR” output as the tool checks the loaded LGR(s) during this process.

3. For validating a label, click on “Validate label” button.
Validate a Label with a Single LGR

1. Enter the label to be validated

2. Click on the “Validate” button

3. Check to include mix script variants
Result given by “Validate label” shows whether the label is valid or invalid and also lists its variants, their dispositions and the rules/actions against which the label or any of its variants is valid or invalid.
Validate a Label with a Merged LGR

1. Enter the label to be validated
2. Select a script from the list of the scripts of different LGRs forming the merged LGR
3. Click on the “Validate” button
Validate a Label with a Merged LGR

Result given by “Validate label” shows whether the label is valid or invalid and also lists its variants, their dispositions and the rules/actions of which the label or any of its variants is valid or invalid.
Review Impact on Existing Labels by Revising an Existing LGR

Agenda Item #10
Review Impacts on Existing Labels Caused by Reviewed LGR

Click on “Diff labels of two LGRs” button to determine differences caused by modifying an LGR.
1. Select first LGR

2. Select second LGR

3. Select file containing labels

5. Check collisions if you want to check label collisions as well

6. Check “Output rules” if you want to check output rules for each label

7. Click on “Get diff” button
Download Results from Task Status Page

### Tasks

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Date/Time</th>
<th>Status</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of 1 IDN table - Oct. 20, 2022, 10:35 a.m.</td>
<td>Download report</td>
<td>Success</td>
<td></td>
</tr>
<tr>
<td>Annotate labels on LGR 5 - Oct. 22, 2022, 5:12 p.m.</td>
<td>Download report</td>
<td>Success</td>
<td></td>
</tr>
<tr>
<td>Diff with LGR Demo-1 - Oct. 22, 2022, 5:46 p.m.</td>
<td>Download report</td>
<td>Success</td>
<td></td>
</tr>
</tbody>
</table>

1. Click on the download link on the homepage to get the “Diff labels of two LGRs” results
Download Results

1. Click on Home link for LGR Tool to get to this page

2. Click on the download link on the homepage to get the “Diff labels of two LGRs” results
Results

# Labels not in LGR 1#

# Labels not in LGR 2#

Label نادي

# LGR comparison#

Label 不合乎条件
Label نادي

## Comparison on label 'كلكتر' [U+06A9 U+0644 U+0643 U+062A U+06C1]

### Test dispositions: ###

```
```

No changes in disposition.

```
```

### Test number of variants: ###

```
```

No changes in number of variants.

## Comparison on label 'نادي' [U+0644 U+0642 U+0627 U+0621]

### Test dispositions: ###

```
```

No changes in disposition.

```
```

### Test number of variants: ###

```
```

No changes in number of variants.

Specifies changes in disposition of labels by the revised LGR

Specifies new variants of labels formed by the revised LGR
Review Impact on Existing Labels by Introducing a New LGR

Agenda Item #11
Select Get Collisions in a List of Labels

Click on “Get collisions in a list of labels” button to determine label collisions from an existing file if a new LGR is introduced – for example, two unique labels become variants of each other.
Enter Details

1. Select LGR

2. Select Labels file

3. Check with existing TLDs

4. Check “Full Dump” to get summary of each operation done on the labels

6. Click on “Get collisions”
Download Results from Task Status Page

<table>
<thead>
<tr>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of 1 IDN table - Oct. 20, 2022, 10:35 a.m.</td>
</tr>
<tr>
<td>Annotate labels on LGR 5 - Oct. 22, 2022, 5:12 p.m.</td>
</tr>
<tr>
<td>Diff with LGR Demo-1 - Oct. 22, 2022, 5:46 p.m.</td>
</tr>
<tr>
<td>Collision with LGR lgr-second-level-arabic-language-31may22-en - Oct. 22, 2022, 5:52 p.m.</td>
</tr>
</tbody>
</table>

Click on the download link to get the “Collisions” results.
Advanced LGR (Label Generation Ruleset) Tools

This application provides a convenient interface for browsing and editing LGRs conforming to the Representing Label Generation Rulesets using XML specification.

Previously loaded LGR file(s)
Previously, you edited the following LGR file(s). Click on its title to resume your editing session.
LGRs
- View lgr-new
- View sample-french
- View union-of-sample-french-and-lgr-4-arabic-script-29jun20-en

Your saved results
The following files contain your tools computation results.
⚠ Note that these files could be cleaned up regularly.
- Download 20210528_102129_collisions_lgr-4-arabic-script-29jun20-en.txt.gz

Create a new LGR file or import an existing one
- Import an existing XML file
⚠ Note that importing large LGR files may take significant time to load on your browser.
- Start with a New blank XML file
Start from a built-in LGR
The following LGRs are pre-installed in the system. You may use them as a starting point for your own LGR. To do so,

Click on Home link for LGR Tool to get to this page
Click on the download link to get the “Collisions” results
Results

# Labels not in LGR #

| Label | | Code points: | | Category: |
|-------|-------|--------------|--------------|
| مجموعه | | [U+06AA U+0644 U+0643 U+062A U+06C1] | | Primary |
| بهبود | | [U+06A9 U+0644 U+0643 U+062A U+06C1] | | Primary |
| مردق | | | |
| معلوم | | | |
| معلقة | | | |
| لجنة | | | |
| محمد | | | |
| وعده | | | |

# Collisions #

## Collision ##

```
...
Label: 'مکتبت' | 'مکتبت'
Code points: [U+06AA U+0644 U+0643 U+062A U+06C1] | [U+06AA U+0644 U+0643 U+062A U+06C1]
Category: Primary | Primary
```

## Collision ##

```
...
Label: 'ملکتة' | 'ملکتة'
Code points: [U+06AA U+0644 U+0643 U+062A U+06C1] | [U+06AA U+0644 U+0643 U+062A U+0629]
Category: Primary | Variant
```

### Details for label 'مکتبت' [U+06AA U+0644 U+0643 U+062A U+06C1] ###

```
...
Variant 'ملکتة' [U+06AA U+0644 U+0643 U+062A U+0629]:
Disposition: invalid
Rules:
```

### Details for label 'ملکتة' [U+06AA U+0644 U+0643 U+062A U+06C1] ###

```
...
Variant 'ملکتة' [U+06AA U+0644 U+0643 U+062A U+0629]:
Disposition: invalid
```
Validate Multiple Labels Using LGR(s)

Agenda Item #12
Select Generate Disposition Annotations

1. Click on “Import” to load existing LGR file(s). See “Import” for details

2. Click on “Generate disp. annotations” button to validate labels given in a text file
Enter Details for Single LGR

1. Select LGR

2. Select Labels file for validation. The labels file contains single label per line in UTF-8 format

3. Click on “Annotate” button
Enter Details for Merged LGR

1. Select LGR
2. Select a script from the list of the scripts of different LGRs forming the merged LGR
3. Select Labels file for validation
4. Click on “Annotate” button

Optional file of existing labels to check for collisions
Download Results from Task Status Page

Click on the download link to get the “Generate disp. annotations” results
Download Results

1. Click on Home link for LGR Tool to get to this page

Advanced LGR (Label Generation Ruleset) Tools

This application provides a convenient interface for browsing and editing LGRs conforming to the Representing Label Generation Rulesets using XML specification.

Previously loaded LGR file(s)

Previously, you edited the following LGR file(s). Click on its title to resume your editing session.

LGRs
- View lgr-new
- View sample-french
- View union-of-sample-french-and-lgr-4-arabic-script-29jun20-en

Your saved results

The following files contains your tools computation results.

⚠️ Note that these files could be cleaned up regularly.

- Download 20210528_102129_collisions_lgr-4-arabic-script-29jun20-en.txt.gz

Create a new LGR file or import an existing one

- Import an existing XML file

⚠️ Note that importing large LGR files may take significant time to load on your browser.

- Start with a New blank XML file

Start from a built-in LGR

The following LGRs are pre-installed in the system. You may use them as a starting point for your own LGR. To do so,
Validation result of each label is written next to it. For invalid labels, the tool also specifies the reason/rule due to which the label is invalid.
View Cross-script Variants of Labels

Agenda Item #13
Select Cross-script Variants

1. Click on “Import” to load single or multiple LGR file(s). See “Import” for details.

2. Click on “Cross-script variants” button to view cross-script variants of labels given in a text file.
**Enter Details**

1. Select single LGR or a merged LGR
2. Select a script from the list of the scripts of different LGRs forming the merged LGR
3. Select Labels file for validation
4. Click on “Launch” button
## Download Results from Task Status Page

<table>
<thead>
<tr>
<th>Tasks</th>
</tr>
</thead>
</table>
| Review of 1 IDN table - Oct. 20, 2022, 10:35 a.m. | ![Download report] Success ![Trash]  
| Annotate labels on LGR 5 - Oct. 22, 2022, 5:12 p.m. | ![Download report] Success ![Trash]  
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| Collision with LGR lgr-second-level-arabic-language-31may22-en - Oct. 22, 2022, 5:52 p.m. | ![Download report] Success ![Trash]  

Click on the download link to get the “Cross-script variants” results
Download Results

Advanced LGR (Label Generation Ruleset) Tools

This application provides a convenient interface for browsing and editing LGRs conforming to the Representing Label Generation Rulesets using XML specification.

Previously loaded LGR file(s)
Previously, you edited the following LGR file(s). Click on its title to resume your editing session.
LGRs
- View lgr-new
- View sample-french
- View union-of-sample-french-and-lgr-4-arabic-script-29jun20-en

Create a new LGR file or import an existing one

Your saved results
The following files contains your tools computation results.

⚠️ Note that these files could be cleaned up regularly.
- Download 20210528_102129_collisions_lgr-4-arabic-script-29jun20-en.txt.gz

Click on the download link to get the “Cross-script variants” results
Input label U+0561 U+0575 U+0580 (ωη) has cross-script variants:
- Cross-variant U+0448 U+0575 U+0580 (ωη), disposition invalid:
  + U+0448 (ω): Cyril
Input label U+0581 U+0561 U+0579 U+0586 (γως) has cross-script variants:
- Cross-variant U+0581 U+0448 U+0579 U+0586 (γως), disposition invalid:
  + U+0448 (ω): Cyril
- Cross-variant U+0067 U+0561 U+0579 U+0586 (γως), disposition invalid:
  + U+0067 (g): Latn
- Cross-variant U+0067 U+0448 U+0579 U+0586 (γως), disposition invalid:
  + U+0448 (ω): Cyril
  + U+0067 (g): Latn
Input label U+0566 U+0578 U+057D (qμν) has cross-script variants:
- Cross-variant U+0566 U+0578 U+0075 (qμν), disposition invalid:
  + U+0075 (u): Latn
- Cross-variant U+0566 U+006E U+057D (qμν), disposition invalid:
  + U+006E (n): Latn
- Cross-variant U+0566 U+006E U+0075 (qμν), disposition invalid:
  + U+0075 (u): Latn
  + U+006E (n): Latn
- Cross-variant U+0071 U+0578 U+057D (qμν), disposition invalid:
  + U+0071 (q): Latn
- Cross-variant U+0071 U+0578 U+0075 (qμν), disposition invalid:
  + U+0071 (q): Latn
  + U+0075 (u): Latn
- Cross-variant U+0071 U+006E U+057D (qμν), disposition invalid:
  + U+0071 (q): Latn
  + U+006E (n): Latn
- Cross-variant U+0071 U+006E U+0075 (qμν), disposition invalid:
  + U+0071 (q): Latn
  + U+006E (n): Latn

Cross-script variants of the label
Disposition of cross-script variants

Specifies the LGR (from a set of multiple LGRs) that is used to generate these cross-script variants
Compare LGRs

Agenda Item #14
Compare LGRs

Click on “Compare two LGRs” under the “Tools” tab for comparing LGRs.
Union, Intersection or Difference

1. Select first LGR
2. Select second LGR
3. Select "Union", "Intersection" or "Diff" to perform relevant function on the two LGRs
4. Click on the "Compare" button
With Merged LGRs, Only Difference

1. Select first LGR
2. Select second LGR
“Diff” selected by default
3. Click on the “Compare” button
Result of Difference function

Result of diff of **proposed-arabic-lgr-18092016-en** with **proposed-arabic-lgr-18092017-en**

**Compare Metadata**

Compare Description:
Second LGR has no description

Languages values differ:
Values only in first LGR: ['und-Arab'].
Values only in second LGR: [].

**Compare repertoire**

Repertoire values differ:
Values only in first LGR: U+062F U+063A U+0635 U+0636 U+0637 U+0630 U+0631 U+062C U+0632 U+062D U+0638 U+0633 U+062E U+0639 U+0634.
Values only in second LGR: .

**Compare common code points in repertoire**

113 code points are identical

**Compare WLE**

Important Note: These operations only provide provisional results which must be manually reviewed and finalized.
Harmonize Multiple LGRs

Agenda Item #15
Select Harmonization

1. Click on “Import” to load single or multiple LGR file(s). See “Import” for details.

2. Click on “Harmonization” button to harmonize two LGR files.
1. Select first LGR

2. Select second LGR

Optional RootZone LGR to infer new variant sets

3. Click on “Harmonize” button
Results

The Harmonized LGRs will also be listed on the homepage.
Computing Variants

Agenda Item # 16
1. Click on “Import” to load single or multiple LGR file(s). See “Import” for details.

2. Click on “Compute Variants” to compute variants of label(s) against imported LGR.
Enter Details

1. Imported LGR

2. File which contains labels to be used for variant computation

3. Press this to compute variants
## Results

### Tasks

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Date/Time</th>
<th>Download Report</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Success</td>
</tr>
</tbody>
</table>

- **Delete completed tasks**

Download results of compute variants
Press here to go to homepage. The results will be present on the homepage when available.

Previously loaded LGR file(s)
Previously, you edited the following LGR file(s). Click on its title to resume your editing session.

LGRs
- View lgr-4-arabic-script-29jun20-en
- View lgr-4-devanagari-script-29jun20-en

Create a new LGR file or import an existing one

Note that importing large LGR files may take significant time to load on your browser.

Your saved results
The following files contains your tools computation results.

⚠️ Note that these files could be cleaned up regularly.

- Download 20201120_092126_labels_variants_lgr-4-devanagari-script-29jun20-en.csv.gz

Download results of compute variants
Engage with ICANN and IDN Program

Thank You and Questions
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