Getting Your Language In

LibreOffice goes BCP 47
– or – Language Tags and all that it entails

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Agenda

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- The Obstacles
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- The Solution
- Results
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About the Speaker

- Eike Rathke, known on the net as erAck
- Based in Hamburg, Germany
- Worked on StarOffice from 1993 to 2000 for Star Division
- Worked on OpenOffice.org from 2000 to 2011 for Sun Microsystems and one other company
- Works on LibreOffice since 2011, employed by Red Hat, Inc.
- Areas of expertise:
  - Calc core, formula compiler and interpreter
  - number formatter/scanner
  - i18n framework, locale data
- Also mentor and knowledge spreader whenever possible
Locales in LibreOffice

A short overview.
Locales in LibreOffice

- Until LO 4.1 known locales use only ISO 639-2 or 639-3 alpha language codes and ISO 3166 alpha country codes
- For example, *en-US* or *de-DE* or *pjt-AU*
  - (Pitjantjatjara in Australia in case you didn't know)
- UNO API uses the `com::sun::star::lang::Locale` struct
- Designed after the Java Locale
- 3 struct members / fields
  - Language
    - Restricted to ISO 639 alpha codes
  - Country
    - Restricted to ISO 3166 alpha codes
  - Variant
    - “free-form” field, platform and application specific
The Obstacles

Something is in the way to that mountain tribe.
The Obstacles

- Application modules locale-wise didn't know about anything else than language and country and were not prepared to encounter anything else
- No ISO 15924 script codes
  - For example, Serbian in Latin script or Cyrillic script is not distinguishable by only language and country codes, the LibreOffice hack was to use sr for Cyrillic and sh for Latin, with the deprecated sh code being abused
- Undefined how to store a script code in a Locale struct
- OpenDocument Format (ODF) 1.0/1.1 only defined fo:language and fo:country to be used
  - Luckily ODF 1.2 additionally defines fo:script
- Unix Locale Identifier, yet another free-form @modifier
  - For example, be_BY@latin or ca_ES@valencia
The Obstacles

- No languages for that no ISO 639 code exists
  - For example, there is Catalan Valencian, for the UI locale the hack ca-XV was used with XV being an ISO 3166 reserved for private use country code, those private use codes must not be stored in ODF's `fo:country`

- No dialects or variants, ISO 639 defines only languages

- No specifics like old and new grammar of one language

- Luckily ODF 1.2 defines `*:rfc-language-tag` (AHAAA!) attributes that can be used in these cases

- The API's com::sun::star::lang::Locale can not be changed or replaced, otherwise almost all existing extensions would cease to work

- Additionally, LibreOffice must know about and in core heavily uses the MS locale identifier, or `LangID`, a 16-bit value
Seeing Light

Nice guys bringing sunshine.
BCP 47, Best Current Praxis

Currently RFC 5646, Tags for the Identification of Languages (previously RFC 4646, 3066, 1766)

For pointers see http://www.langtag.net/ and my selection at http://erack.de/bookmarks/D.html#Language_Tags

language ["-" script] ["-" region] *("-" variant) *("-" extension) ["-" privateuse]

For example ca-valencia for Catalan Valencian

Where ca is language and valencia is variant

Tags are registered with IANA (Internet Assigned Numbers Authority)

Reuse of codes/tags for different languages or countries will not happen, like it was the case with ISO 3166 CS, first Czechoslovakia then Serbia and Montenegro
New attributes will be possible, for example specify that a document uses
- “German in the traditional spelling/orthography before 1996”
  - `de-DE-1901`
- “British English with Oxford English Dictionary spelling”
  - `en-GB-oed`
- important because it is mandatory for UN documents
The Solution

Throw away, replace and polish.
The Solution

- Use *liblangtag* to parse, validate and canonicalize language tags if they are not of simple cases already known to the application
  - [http://tagoh.bitbucket.org/liblangtag/](http://tagoh.bitbucket.org/liblangtag/)
  - Will be included in upcoming or is already in latest Debian and Fedora releases

- Validation: language alpha code and subtags must be registered with IANA

- Canonicalization: transform a valid language tag to the most concise form, for example *de-Latn-DE* becomes *de-DE* because Latin is the default script for German
The Solution

- Define a convention to transport language tags in `com::sun::star::lang::Locale`
  - If a locale can be expressed as ISO language and country codes only, use those in Language and Country fields
    - Maintains compatibility with currently used locales
  - Else, if a locale contains a script code or needs to be expressed as language tag, set the Language field to the `qlt`
    - ISO 639-3 reserved for private use code and set the Variant field to the full language tag
  - The Country field may contain the corresponding ISO 3166 alpha country code, if any, or otherwise must be empty (if applicable, language tag contains the region subtag)
The Solution

- Create a central service to accept, store, convert between and obtain
  - Language tags
  - Locales
  - MS LangIDs
  - Unix Locale Identifiers
  - Single tags like language, script, country, …
  - Information how a locale can be expressed for ODF
- Get rid of all handcrafted places that extract or assemble such information, usually only handling language and country because nothing else was known at that time
- Replace with the central service
Results for LibreOffice 4.0

In the middle of everywhere.
Results for LibreOffice 4.0

- Introduced class LanguageTag
- Now (master and 4.2) include/i18nlangtag/languagetag.hxx, i18nlangtag/source/languagetag/*
- Single central place that uses liblangtag, encapsulated
- Internally uses some of the old but now adapted MsLangId::convert...() methods for known locales for quick and easy implementation
- Replaced all uses of MsLangId::convert...() methods throughout the entire code base with instantiation of and calls to LanguageTag
- Removed most MsLangId::convert...() methods and made remaining methods used by LanguageTag private to prevent further access by application modules
Results for LibreOffice 4.0, continued

- Consolidated various different uses of an empty locale meaning, depending on context
  - System locale
  - Absence of language
  - Undetermined language or all languages

- Empty locale or language tag now means system locale, except in a linguistic service to obtain all available writing aids, for API stability

- Absence of language information consistently expressed as `zxx` ISO 639 special code

- Undetermined language consistently expressed as `und` ISO 639 special code
More Results, LibreOffice 4.2

Completing a milestone.
More Results, LibreOffice 4.2

- Introduced the LanguageTag handling to low level code interfacing with `rtl_Locale`
- Prepared the i18n framework for language tags
  - Special care needed for places where it interfaces with ICU
  - Conversion from language tag to ICU locale when necessary
- Introduced `qlt` to locale data's `<LC_INFO><Language>` element
- Made the locale data's `<LC_INFO><Variant>` element hold the BCP 47 language tag string
More Results, LibreOffice 4.2, continued

- Implemented reading and writing ODF with fo:script and *:rfc-language-tag when necessary
- Prepared writing aids (spell checker, thesaurus) to use language tags
- Reworked the current known locales to be able to introduce script and/or full language tags
- Implemented proper handling of existing workarounds
  - For example, ca-XV is now ca-ES-valencia (full locale, or ca-valencia for language only) and old sh-RS is sr-Latn-RS
  - With fallbacks for old sh-* tags to be able to read existing documents
Implemented an internal language tag registration to be able to generate on-the-fly MS-LangIDs in chunks of the reserved for user-defined IDs areas.

Reading a document that contains a valid but unmapped language tag generates such LangID on the fly and for selected text the language tag is displayed in the status bar and language listbox.

Such unmapped tags are preserved and written to the ODF file again when saving the document.

See also
Temporary Language Tag Read From File
File Changes to Permanently Add New Languages

- include/i18nlangtag/lang.h
- MS-LangID, either defined by Microsoft or new ID in the user-defined ranges
- i18nlangtag/source/isolang/isolang.cxx
- Mapping between MS-LangID and language tag
- svtools/source/misc/langtab.src
- Entry for the language listbox
- i18nlangtag/source/isolang/moslangid.cxx
  - MsLangId::isRightToLeft() if RTL or MsLangId::getScriptType() if CTL language
- solenv/inc/langlist.mk
  - Build entry once translation is ready to be integrated
File Changes to Permanently Add New Languages

- Full description at https://wiki.documentfoundation.org/LibreOffice_Localization_Guide/Adding_a_New_Language_or_Locale
- or in the wiki search enter “adding language”
Still more TODO

Maybe even for you?
Still more TODO

- Introduce the LanguageTag handling to low level code interfacing with calls to `setlocale()`
- Implement support for constructing Unix locales
  - `liblangtag` knows to parse glibc locales
    - Needs some enhancement to not just obtain from LC_CTYPE but also from LC_MESSAGES or others
  - Best also have it construct those locale strings then
  - Above needs changes to `liblangtag`
- Display descriptions for on-the-fly tags read from documents
  - Possibly using the IANA registration's `Description` field
  - Would need translation of descriptions
Still more TODO, continued

- Make adding new languages for spell-checking purposes not yet handled by LibreOffice easier
- Could be done with configuration entries
- Installing spell checker / dictionary extensions providing support for a new language tag could configure that new tag
Still more TODO, for you?

- There's room for improvement in various applications that don't use language tags yet but could, such as
  - Other ODF 1.2 generators and consumers, implement the `fo:script` and `*:rfc-language-tag` attributes
  - The locale data generator at it46.se (let's talk)
  - LibreOffice extension developers when evaluating a Locale's content should prepare for the `qlt` code in the Language field and if present handle language tags in the Variant field
  - `fontconfig`, use language tag instead of language-territory
  - … your application?
Questions?

I hope to be able to answer.
Thank you …

- … for using LibreOffice!
- … for supporting LibreOffice!
- … for hacking LibreOffice!