NUMBERTEXT and MONEYTEXT Spreadsheet Functions[1]
OpenOffice.org 3.x Calc

Document - ID	Specification Owner	Last Change	Status
	László Németh	2009-08-06	Draft

Conforms to	Thai subset of MONEYTEXT is standardized by the ECMA–376 and ISO/IEC 29 500:2008 (Office Open XML) as BAHTTEXT, also by OpenOffice.org (http://specs.openoffice.org/calc/compatibility/bahttext.odt). RuleBasedNumberFormat of IBM ICU is similar, but insufficient tool to spell out numbers with or without currencies.
Applies to	Calc
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Category	Feature

Abstract

The NUMBERTEXT and MONEYTEXT functions allow to convert numbers to number names. The output of the MONEYTEXT includes the names of the currency units, too. Example: The number 1.5 can be converted to the Thai text "หนึ่งบาทห้าสิบสตางค์" and the English text "One Baht and fifty Satang" by the MONEYTEXT(1.5; "THY"; 2; "th-TH") and MONEYTEXT(1.5; "THY"; 2; "en-US") function calls.

i-Team Members (The specification owner is part of the i-Team)

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1 Note: this specification covers only spreadsheet functions, but it can be extend for number formats, too.

Document Change History

Rev. Level	Change	Initials	Date
1.0	Initial revision	nemeth	2009-07-23
1.1.	Fixes	nemeth	2009-08-06

Contents

Glossary

Term	Description
regex	regular expression (standard)

1   Motivation

To replace the standardized, but insufficient BAHTTEXT function and the several other (often bad) solutions for number to number name conversions with a good international standard.

2   User Scenarios

This feature will solve a frequently required task: to convert numbers to number names (words) in invoices, checks, contracts etc. Ease-of-Use with competitive products (Excel has an on-line solution). It is mandatory that the users finds a comparable functionality within the same feature as in competitive products.

3   Goals

Add a requested feature. Increase compatibility with competitive spreadsheet products. Also help OpenFormula to be top-compliant with the ECMA/ISO BAHTTEXT without degrading its high requirements for an international standard.

4   Requirements and Dependencies

4.1   Requirements

To meet the needs of users and to add a real innovative/competitive feature, Calc needs NUMBERTEXT and MONEYTEXT.

4.2   Technical Dependencies

The NUMBERTEXT and MONEYTEXT implementation uses Soros language and resources of NUMBERTEXT.org (see [SorosSpec] and [NUMBERTEXT]).

5   Competitive Analyses

Microsoft has on-line support for Excel spreadsheet only for English number to number name conversion ([MSsup]).

Apache OFBiz (The Apache Open for Business Project) uses RuleBasedNumberFormat of IBM ICU for this task, but only for English language, because of IBM ICU doesn't offer MONEYTEXT function (see hard-wired English rule set in [Ofbiz]).

IBM ICU contains several inconsistent rule sets for number conversion without currencies ([ICU]), but its RuleBasedNumberFormat class is insufficient for currency handling (also for number handling: [ICU2]).

40   The regex based Soros language [SorosSpec] can handle complex orthography and grammar of number names in a simple way. NUMBERTEXT.org [NUMBERTEXT] has resources for 20 languages with major and country-dependent currency support and it is the dedicated site to extend this database.

The OpenOffice.org NUMBERTEXT extension is a working demonstration of the planned NUMBERTEXT/MONEYTEXT feature of Calc ([NUMext]).

45   # 6   Detailed Specification

The functions are named NUMBERTEXT and MONEYTEXT.

NUMBERTEXT expects one string argument (input value) and one optional argument to set the target language. Without the language code, the target language is the language of the document. There is no rounding.

50   MONEYTEXT expects a numeric argument and a currency code before the same optional target language option. Without the language code, the target language is the language of the document. All numerical input values are valid (there is no restricted range of valid values). Rounding depends from the currency.

Syntax:

55   =NUMBERTEXT(String value; [; Language])

=MONEYTEXT(Numeric value; Currency; [; Language])

Language codes: **xx-XX**, **xxx-XX**, **xx-XX-variant**, **xxx-XX-variant**, where "xx", "xxx" are ISO 639-1 and (if necessary) ISO 639-2 language codes and "XX" is an ISO 3166-1 alpha-2 country code. Variant is the name or the number of the language variants. For special conversions, the name of the target encoding
60   is used. For example, "Roman" and "Suzhou" for Roman and Suzhou numbers.

Currency codes: ISO 4217 (eg. USD).

Examples:

=NUMBERTEXT(1) returns "**one**", when the language of the document is English.

=NUMBERTEXT(1.00) returns "**one**", when the language of the document is English (it may depend from
65   automatic number to string conversion of the spreadsheet).

=NUMBERTEXT("1.00") returns "**one dot zero zero**", when the language of the document is English.

=NUMBERTEXT(3,1415) returns "**drei Komma eins vier eins fünf**", when the language of the document is German.

=MONEYTEXT(123.456; "EUR") returns "**one hundred and twenty-three euro and forty-six cents**",
70   when the language of the document is English.

=MONEYTEXT(12.649; "THY"; "th-TH") returns "สิบสองบาทหกสิบห้าสตางค์" which means "**Twelve Baht** and **sixty five Satang**".

Implementation

The implementation uses the Soros programming language (see [SorosSpec]).

75   **Tab Order**

None.

Key Board Shortcuts

None.

6.1 G11n

80   None.

6.2   Error Conditions

Missing parameter results in Err:511 (missing parameter).

Too many parameters results in Err:504 (error in parameter list).

Parameter not a number results in Err:502 (invalid argument).

85   ## 6.3   Migration

None.

7   Future Tasks

None.

8   Notes

90   None.

9   References

[ICU] ICU rule sets, https://ssl.icu-project.org/trac/browser/icu/trunk/source/data/rbnf

[ICU2] "Ettusen" problem of Swedish rules, see in http://icu-project.org/trac/attachment/ticket/6493/sv.txt

[NUMBERTEXT] NUMBERTEXT.org, http://www.numbertext.org

95   [NUMext] NUMBERTEXT extension, http://extensions.services.openoffice.org/project/numbertext

[MSSup] How to convert a numeric value into English words in Excel, Microsoft Help and Support, http://support.microsoft.com/kb/213360.

[OfBiz] UtilAccounting.java, http://svn.ofbiz.org/viewcvs/*checkout*/trunk/applications/accounting/src/org/ofbiz/accounting/util/UtilAccounting.java?rev=6744

100   [SorosSpec] Soros Language Specification, http://www.numbertext.org/sorosspec.odt