I18N.DotNet main@ae7210

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1 I18N.DotNet	1
1.1 About	1
1.2 Installation	1
1.3 Getting Started	1
1.3.1 Adapting Source Code (I18N)	1
1.3.2 Writing Translations (L10N)	2
1.4 Advanced Usage	2
1.4.1 Language Identifiers & Variants	2
1.4.2 String Format	3
1.4.3 Global and Local Localizers	3
1.4.4 Contexts	3
1.4.5 Embedding the Translations File	4
2 Namespace Index	5
2.1 Package List	5
3 Hierarchical Index	7
3.1 Class Hierarchy	7
4 Class Index	9
4.1 Class List	9
5 Namespace Documentation	11
5.1 I18N Namespace Reference	11
5.2 I18N.DotNet Namespace Reference	11
6 Class Documentation	13
6.1 Global Class Reference	13
6.1.1 Detailed Description	13
6.1.2 Member Function Documentation	13
6.1.2.1 Context()	13
6.1.2.2 Localize() [1/3]	14
6.1.2.3 Localize() [2/3]	14
6.1.2.4 Localize() [3/3]	15
6.1.2.5 LocalizeFormat()	15
6.1.3 Property Documentation	16
6.1.3.1 Localizer	16
6.2 ILocalizer Interface Reference	16
6.2.1 Detailed Description	16
6.2.2 Member Function Documentation	16
6.2.2.1 Localize() [1/3]	16
6.2.2.2 Localize() [2/3]	17
6.2.2.3 Localize() [3/3]	17
6.2.2.4 LocalizeFormat()	18

0.04 D + 2 - 1 D 1 - 2	
6.3.1 Detailed Description	19
6.3.2 Constructor & Destructor Documentation	19
6.3.2.1 Localizer()	19
6.3.3 Member Function Documentation	20
6.3.3.1 Context() [1/2]	20
6.3.3.2 Context() [2/2]	20
6.3.3.3 LoadXML() [1/3]	21
6.3.3.4 LoadXML() [2/3]	21
6.3.3.5 LoadXML() [3/3]	21
6.3.3.6 Localize() [1/3]	22
6.3.3.7 Localize() [2/3]	22
6.3.3.8 Localize() [3/3]	23
6.3.3.9 LocalizeFormat()	23
6.3.3.10 SetTargetLanguage()	23
6.4 Localizer.ParseException Class Reference	24
6.4.1 Detailed Description	24
6.4.2 Constructor & Destructor Documentation	24
6.4.2.1 ParseException()	24
6.5 PlainString Class Reference	24
6.5.1 Detailed Description	25
6.5.2 Constructor & Destructor Documentation	25
6.5.2.1 PlainString()	25
6.5.3 Member Function Documentation	25
6.5.3.1 operator PlainString() [1/2]	25
6.5.3.2 operator PlainString() [2/2]	26
6.5.4 Property Documentation	26
6.5.4.1 Value	26
Index	27

I18N.DotNet

Documentation in PDF format is available here.

1.1 About

I18N.DotNet is a .NET library written in C# to enable simple internationalization (I18N) / localization (L10N) (i.e. translation to different languages) of .NET applications and libraries.

A companion utility I18N.DotNet Tool is provided to ease management of translation files.

1.2 Installation

The easiest way to install I18N.DotNet is using the NuGet package: https://www.nuget.←org/packages/I18N.DotNet/

1.3 Getting Started

1.3.1 Adapting Source Code (I18N)

Source code must be adapted following two simple steps:

- The first step consists in adding a couple of calls during initialization of the program (before any translated string is used):
 - Call I18N.DotNet.Global.Localizer.SetTargetLanguage() to set the language to which strings will be translated.
 - Call I18N.DotNet.Global.Localizer.LoadXML() to load the file that contains the translations.
- The second step consists in adapting the source code in order to wrap the strings to be translated with a call to I18N.DotNet.Global.Localize().

2 I18N.DotNet

```
Example using static I18N.DotNet.Global;
using System;
using System.IO;
using System.Reflection;
public class Program
{
   static void Main( string[] args )
   {
     var programPath = Path.GetDirectoryName( Assembly.GetExecutingAssembly().Location );
     int i = 0x555;
     Localizer.SetTargetLanguage( CultureInfo.CurrentUICulture.Name ).LoadXML( programPath + "/I18N.xml" );
     Console.WriteLine( Localize( "Plain string to be translated" ) );
     Console.WriteLine( Localize( $"Interpolated string to be translated with value {i:X4}" ) );
}
```

1.3.2 Writing Translations (L10N)

String translations must be stored in an XML file with root element I18N.

For each string than has been internationalized an Entry element under the root must be defined, with:

- A single Key child element which value is the internationalized string defined in the code (replacing for interpolated strings the interpolated expressions with their positional index).
- Valuechild elements with their attribute lang set to the target language of the translation and which value is the translated string.

The companion utility I18N.DotNet Tool can be used to ease the creation of the translations file by scanning source files and automatically generating entries for discovered internationalized strings.

1.4 Advanced Usage

1.4.1 Language Identifiers & Variants

Any arbitrary string can be used for identifying languages, and they are processed as case-insensitive.

When using language identifiers formed by a primary code and a variant code separated by an hyphen (e.g., _"enus"_, _"es-es"_), if a localized conversion for the language variant is not found then a conversion for the primary (base) language is tried too.

For example, if "en-gb" is passed to Localizer. SetTargetLanguage (), then for each string to be translated a translation for the language _"en-gb"_ will be searched first, and if not found then a translation for the language _"en"_ will be searched next.

It is therefore recommended to:

- Use primary-variant code (e.g., _"en-us"_, _"es-es"_) as target language identifiers (i.e., as arguments to Localizer.SetTargetLanguage()).
- Use primary code (e.g., _"en"_, _"fr"_) as translation language identifiers (i.e, as the lang attribute values of XML I18N.Entry.Value entries) for generic (non variant-specific) translations.
- Use primary code-variant (e.g., _"en-gb"_, _"es-ar"_) as translation language identifiers (i.e, as the lang attribute values of XML I18N.Entry.Value entries) for variant-specific translations.

1.4 Advanced Usage 3

1.4.2 String Format

Calls to String.Format() where the format string has to be internationalized can be replaced by a call to I18N.DotNet.Global.LocalizeFormat() (or LocalizeFormat(), see Global and Local Localizers).

```
Example String.Format (Localize ("Format string to be translated with value \{0\}"), myVar); 
// is equivalent to LocalizeFormat ("Format string to be translated with value \{0\}", myVar);
```

1.4.3 Global and Local Localizers

Instances of the Localizer class are responsible for loading string translations and then providing localization functionality (i.e. perform string translations) for software components.

The static class I18N.DotNet.Global has the property Localizer which contains the global localizer. This instance is shared and can be conveniently used by all software components. In fact all the methods exposed by the I18N.DotNet.Global class are just convenience wrappers that call the global localizer.

If necessary, additional instances of the Localizer class can be created (local localizers), loaded with string translations, and then passed to software components for being used instead of the global localizer. Nevertheless, for most cases using the global localizer is just enough.

1.4.4 Contexts

Sometimes the same source language string has different translations in different contexts (e.g., English _"OK" \leftarrow _ should be translated in Spanish to _"Aceptar"_ for a button label but to _"Correcto"_ for a successful outcome indication).

Since the source language key is the same in both cases, context partitioning must be used, which affects the source code side and the translations file side.

1.4.4.0.1 Context Partitioning in Source Code (I18N) In source code, the context of the key can be explicitly indicated when the string is being internationalized by calling I18N.DotNet.Global.Context() (or Localizer.Context(), see Global and Local Localizers) and passing it the context identifier, and then calling the localization methods on the returned context Localizer.

Contexts can be nested. A chain of successively nested contexts can be identified by joining their identifiers using the dot character ('.') as a composite context identifier.

Translations in a context are searched hierarchically: if a translation is not found for the target language in is context (neither for the language variant nor the primary language), then a translation is searched again on its parent context (if it exists).

```
Example Button.Label = Context( "GUI.Button" ).Localize( "OK" );
// ...
TextBox.Text = Context( "GUI" ).Context( "Status" ).Localize( "OK" );
```

1.4.4.0.2 Context Partitioning in the Translation File (L10N) Context partitioning is performed in the translations XML file using Context elements as children of the root element or nested within other Context elements. These elements must have an id attribute to indicate the context identifier (which can be a composite context identifier), and are containers for the Entry elements that define the translations for that context.

4 I18N.DotNet

```
Example <?xml version="1.0" encoding="utf-8"?>
  <Entry>
    <Key>OK</Key>
<Value lang="fr">O.K.</Value>
  </Entry>
  <Context id="GUI">
    <Context id="Button">
      <Entry>
        <Key>OK</Key>
        <Value lang="es">Aceptar</Value>
      </Entry>
    </Context>
    <Context id="Button">
      <Entry>
        <Key>OK</Key>
<Value lang="es">Correcto</Value>
      </Entry>
    </Context>
  </Context>
</I18N>
```

1.4.5 Embedding the Translations File

Instead of using translation files installed on the filesystem during the installation procedure for the application, these files can be embedded inside an executable assembly. Embedded resource files can then be accessed as Stream objects which are passed to Localizer. LoadXML.

Namespace Index

Here are the packages with brief descriptions (if available):

2.1 Package List

I4 ONI			-

6 Namespace Index

Hierarchical Index

3.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

ApplicationException																	
Localizer.ParseException	 							 									24
Global	 			 		 											13
ILocalizer	 			 		 											16
Localizer	 							 									18
PlainString																	2/

8 Hierarchical Index

Class Index

4.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Global		
	Utility class for convenient access to localization functions.	13
ILocalize	er	
	Converter of strings from a language-neutral value to its corresponding language-specific localization.	16
Localize	er	
	Converter of strings from a language-neutral value to its corresponding language-specific local-	
	ization	18
Localize	er.ParseException	
	Exception thrown when a localization file cannot be parsed properly.	24
PlainStr	ring	
	Represents just a string. This class is used to allow interpolated strings to preferably be passed as FormattableString instead of string to methods that overload both types.	24

10 Class Index

Namespace Documentation

5.1 I18N Namespace Reference

Namespaces

namespace DotNet

5.2 I18N.DotNet Namespace Reference

Classes

· class Global

Utility class for convenient access to localization functions.

interface ILocalizer

Converter of strings from a language-neutral value to its corresponding language-specific localization.

· class Localizer

Converter of strings from a language-neutral value to its corresponding language-specific localization.

class PlainString

Represents just a string. This class is used to allow interpolated strings to preferably be passed as FormattableString instead of string to methods that overload both types.

Class Documentation

6.1 Global Class Reference

Utility class for convenient access to localization functions.

Static Public Member Functions

- static string Localize (PlainString text)
 - Localizes a string using the global localizer.
- static string Localize (FormattableString frmtText)
 - Localizes an interpolated string using the global localizer.
- static IEnumerable < string > Localize (IEnumerable < string > texts)
 Localizes multiple strings.
- static string LocalizeFormat (string format, params object[] args)

Localizes and then formats a string using the global localizer.

• static Localizer Context (string contextId)

Gets a context in the global localizer.

Properties

```
• static Localizer Localizer = new Localizer() [get]
```

6.1.1 Detailed Description

Utility class for convenient access to localization functions.

6.1.2 Member Function Documentation

6.1.2.1 Context()

Gets a context in the global localizer.

See also

Localizer.Context(string)

Parameters

context←	Identifier of the context
ld	

Returns

Localizer for the given context

6.1.2.2 Localize() [1/3]

Localizes an interpolated string using the global localizer.

See also

Localizer.Localize(FormattableString)

Parameters

tText Language-neutral formattable string	frmtText
---	----------

Returns

Formatted string generated from the language-specific localized format string if found, or generated from frmtText otherwise

6.1.2.3 Localize() [2/3]

```
static IEnumerable< string > Localize ( {\tt IEnumerable} < {\tt string} > {\tt texts} \; ) \quad [{\tt static}]
```

Localizes multiple strings.

Converts the language-neutral strings in texts to their corresponding language-specific localized values.

Parameters

texts	Array of language-neutral strings
	1

6.1 Global Class Reference 15

Returns

Array with the language-specific localized strings if found, or the language-neutral string otherwise

6.1.2.4 Localize() [3/3]

Localizes a string using the global localizer.

See also

Localizer.Localize(PlainString)

Parameters

text	Language-neutral string
------	-------------------------

Returns

Language-specific localized string if found, or text otherwise

6.1.2.5 LocalizeFormat()

Localizes and then formats a string using the global localizer.

See also

Localizer.LocalizeFormat(string, object[])

Parameters

format	Language-neutral format string
args	Arguments for the format string

Returns

Formatted string generated from the language-specific localized format string if found, or generated from *format* otherwise

6.1.3 Property Documentation

6.1.3.1 Localizer

```
Localizer Localizer = new Localizer() [static], [get]

Global localizer.
```

6.2 ILocalizer Interface Reference

Converter of strings from a language-neutral value to its corresponding language-specific localization.

Inheritance diagram for ILocalizer:



Public Member Functions

string Localize (PlainString text)

Localizes a string.

string Localize (FormattableString frmtText)

Localizes an interpolated string.

string LocalizeFormat (string format, params object[] args)

Localizes and then formats a string.

IEnumerable < string > Localize (IEnumerable < string > texts)

Localizes multiple strings.

6.2.1 Detailed Description

Converter of strings from a language-neutral value to its corresponding language-specific localization.

6.2.2 Member Function Documentation

6.2.2.1 Localize() [1/3]

Localizes an interpolated string.

Converts the composite format string of the language-neutral formattable string *frmtText* (e.g.an interpolated string) to its corresponding language-specific localized composite format value, and then generates the result by formatting the localized composite format value along with the *frmtText* arguments by using the formatting conventions of the current culture.

Parameters

frmtText	Language-neutral formattable string
----------	-------------------------------------

Returns

Formatted string generated from the language-specific localized format string if found, or generated from frmt ← Text otherwise

Implemented in Localizer.

6.2.2.2 Localize() [2/3]

```
IEnumerable< string > Localize (  \label{eq:ienumerable} \mbox{IEnumerable} < \mbox{string} > \mbox{\it texts} \mbox{ )}
```

Localizes multiple strings.

Converts the language-neutral strings in texts to their corresponding language-specific localized values.

Parameters

```
texts Language-neutral strings
```

Returns

Implemented in Localizer.

6.2.2.3 Localize() [3/3]

Localizes a string.

Converts the language-neutral string *text* to its corresponding language-specific localized value.

Parameters

text Language-neutral string

Returns

Language-specific localized string if found, or text otherwise

Implemented in Localizer.

6.2.2.4 LocalizeFormat()

Localizes and then formats a string.

Converts the language-neutral format string *format* to its corresponding language-specific localized format value, and then generates the result by formatting the localized format value along with the *args* arguments by using the formatting conventions of the current culture.

Parameters

format	Language-neutral format string
args	Arguments for the format string

Returns

Formatted string generated from the language-specific localized format string if found, or generated from *format* otherwise

Implemented in Localizer.

6.3 Localizer Class Reference

Converter of strings from a language-neutral value to its corresponding language-specific localization.

Inheritance diagram for Localizer:



Classes

• class ParseException

Exception thrown when a localization file cannot be parsed properly.

Public Member Functions

· Localizer ()

Default constructor.

string Localize (PlainString text)

Localizes a string.

Converts the language-neutral string text to its corresponding language-specific localized value.

• string Localize (FormattableString frmtText)

Localizes an interpolated string.

Converts the composite format string of the language-neutral formattable string frmtText (e.g.an interpolated string) to its corresponding language-specific localized composite format value, and then generates the result by formatting the localized composite format value along with thefrmtText arguments by using the formatting conventions of the current culture.

string LocalizeFormat (string format, params object[] args)

Localizes and then formats a string.

Converts the language-neutral format string format to its corresponding language-specific localized format value, and then generates the result by formatting the localized format value along with theargs arguments by using the formatting conventions of the current culture.

IEnumerable < string > Localize (IEnumerable < string > texts)

Localizes multiple strings.

Converts the language-neutral strings in texts to their corresponding language-specific localized values.

Localizer Context (string contextId)

Gets the localizer for a context in the current localizer.

Localizer Context (IEnumerator < string > splitContextIds)

Gets the localizer for a context in the current localizer.

Localizer SetTargetLanguage (string language)

Sets the localized language to which conversion will be performed.

void LoadXML (string filepath, bool merge=true)

Loads a localization configuration from a file in XML format.

void LoadXML (Stream stream, bool merge=true)

Loads a localization configuration from a stream in XML format.

void LoadXML (XDocument doc, bool merge=true)

Loads a localization configuration from a XML document.

6.3.1 Detailed Description

Converter of strings from a language-neutral value to its corresponding language-specific localization.

6.3.2 Constructor & Destructor Documentation

6.3.2.1 Localizer()

Localizer ()

Default constructor.

6.3.3 Member Function Documentation

6.3.3.1 Context() [1/2]

```
Localizer Context (

IEnumerator< string > splitContextIds )
```

Gets the localizer for a context in the current localizer.

Contexts are used to disambiguate the conversion of the same language-neutral string to different language-specific strings depending on the context where the conversion is performed.

Parameters

entifiers in split form	splitContextIds
-------------------------	-----------------

Returns

Localizer for the given context

6.3.3.2 Context() [2/2]

```
Localizer Context ( string\ contextId\ )
```

Gets the localizer for a context in the current localizer.

Contexts are used to disambiguate the conversion of the same language-neutral string to different language-specific strings depending on the context where the conversion is performed.

Contexts can be nested. The context identifier can identify a chain of nested contexts by separating their identifiers with the '.' character (left = outermost / right = innermost).

Parameters

context←	Identifier of the context
ld	

Returns

Localizer for the given context

6.3.3.3 LoadXML() [1/3]

```
void LoadXML ( Stream\ stream, bool\ merge\ =\ true\ )
```

Loads a localization configuration from a stream in XML format.

Precondition: The language must be set before calling this method.

Parameters

stream	Stream with the localization configuration in XML format
merge	Replaces the current localization mapping with the loaded one when <c>false, otherwise merges both (existing mappings are overridden with loaded ones).</c>

Exceptions

InvalidOperationException	Thrown when the language is not set.
ParseException	Thrown when the input file cannot be parsed properly.

6.3.3.4 LoadXML() [2/3]

Loads a localization configuration from a file in XML format.

Precondition: The language must be set before calling this method.

Parameters

filepath	Path to the localization configuration file in XML format
merge	Replaces the current localization mapping with the loaded one when < c > false, otherwise merges
	both (existing mappings are overridden with loaded ones).

Exceptions

InvalidOp	perationException	Thrown when the language is not set.
	ParseException	Thrown when the input file cannot be parsed properly.

6.3.3.5 LoadXML() [3/3]

```
void LoadXML (
```

```
XDocument doc,
bool merge = true )
```

Loads a localization configuration from a XML document.

Precondition: The language must be set before calling this method.

Parameters

doc	XML document with the localization configuration
merge	Replaces the current localization mapping with the loaded one when <c>false, otherwise merges both (existing mappings are overridden with loaded ones).</c>

Exceptions

InvalidOperationException	Thrown when the language is not set.
ParseException	Thrown when the input file cannot be parsed properly.

6.3.3.6 Localize() [1/3]

Localizes an interpolated string.

Converts the composite format string of the language-neutral formattable string *frmtText* (e.g.an interpolated string) to its corresponding language-specific localized composite format value, and then generates the result by formatting the localized composite format value along with the *frmtText* arguments by using the formatting conventions of the current culture.

Implements ILocalizer.

6.3.3.7 Localize() [2/3]

Localizes multiple strings.

Converts the language-neutral strings in *texts* to their corresponding language-specific localized values.

Implements ILocalizer.

6.3.3.8 Localize() [3/3]

```
string Localize ( {\tt PlainString}~text~)
```

Localizes a string.

Converts the language-neutral string text to its corresponding language-specific localized value.

Implements ILocalizer.

6.3.3.9 LocalizeFormat()

Localizes and then formats a string.

Converts the language-neutral format string *format* to its corresponding language-specific localized format value, and then generates the result by formatting the localized format value along with the *args* arguments by using the formatting conventions of the current culture.

Implements ILocalizer.

6.3.3.10 SetTargetLanguage()

Sets the localized language to which conversion will be performed.

Language matching is case-insensitive.

Any arbitrary string can be used for identifying languages, but when using language identifiers formed by a primary code and a variant code separated by an hyphen(e.g., "en-us") if a localized conversion for the "full" language is not found then a conversion for the primary(base) language is tried too.

Parameters

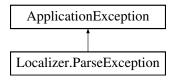
language	Name, code or identifier for the language
----------	---

Returns

6.4 Localizer.ParseException Class Reference

Exception thrown when a localization file cannot be parsed properly.

Inheritance diagram for Localizer.ParseException:



Public Member Functions

ParseException (string message)
 Constructor.

6.4.1 Detailed Description

Exception thrown when a localization file cannot be parsed properly.

6.4.2 Constructor & Destructor Documentation

6.4.2.1 ParseException()

```
ParseException (
string message )

Constructor.

Parameters

message | A message that describes the error.
```

6.5 PlainString Class Reference

Represents just a string. This class is used to allow interpolated strings to preferably be passed as Formattable

String instead of string to methods that overload both types.

Public Member Functions

PlainString (string value)
 Default constructor.

Static Public Member Functions

• static implicit operator PlainString (string value)

Converts a string value to a PlainString.

static implicit operator PlainString (FormattableString arg)

Converts a FormattableString value to a PlainString.

Properties

• string Value [get]

6.5.1 Detailed Description

Represents just a string. This class is used to allow interpolated strings to preferably be passed as Formattable

String instead of string to methods that overload both types.

6.5.2 Constructor & Destructor Documentation

6.5.2.1 PlainString()

```
PlainString ( string value )
```

Default constructor.

6.5.3 Member Function Documentation

6.5.3.1 operator PlainString() [1/2]

Converts a FormattableString value to a PlainString.

This implicit operator is needed to avoid FormattableString values to be automatically converted to string and then to PlainString when resolving parameter overloads.

Value

Exceptions

6.5.3.2 operator PlainString() [2/2]

```
static implicit operator PlainString ( {\tt string} \ value \ ) \quad [{\tt static}]
```

Converts a string value to a PlainString.

Parameters

6.5.4 Property Documentation

6.5.4.1 Value

string Value [get]

Value of the string.

Index

```
Context
     Global, 13
     Localizer, 20
Global, 13
     Context, 13
     Localize, 14, 15
     LocalizeFormat, 15
     Localizer, 16
I18N, 11
I18N.DotNet, 11
ILocalizer, 16
     Localize, 16, 17
     LocalizeFormat, 18
LoadXML
     Localizer, 20, 21
Localize
     Global, 14, 15
     ILocalizer, 16, 17
     Localizer, 22
LocalizeFormat
     Global, 15
     ILocalizer, 18
     Localizer, 23
Localizer, 18
     Context, 20
     Global, 16
     LoadXML, 20, 21
     Localize, 22
     LocalizeFormat, 23
     Localizer, 19
     SetTargetLanguage, 23
Localizer.ParseException, 24
     ParseException, 24
operator PlainString
     PlainString, 25, 26
ParseException
     Localizer.ParseException, 24
PlainString, 24
     operator PlainString, 25, 26
     PlainString, 25
     Value, 26
SetTargetLanguage
     Localizer, 23
Value
```

PlainString, 26