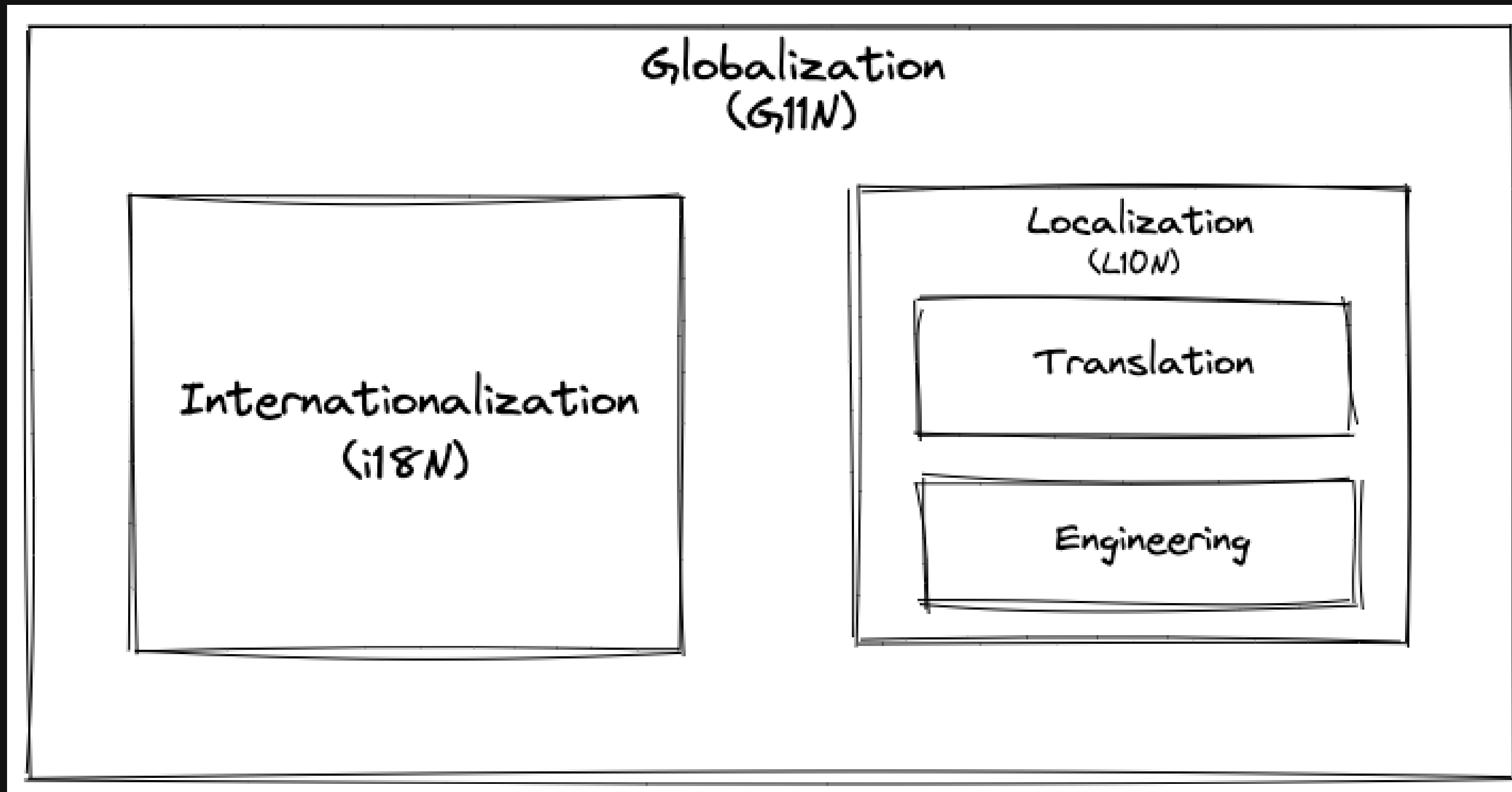


# i18N in Java

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# G11N/i18N/L10N



Internationalization is the process of designing an application so that it can be adapted to various languages and regions without engineering changes.

An internationalized program has the following characteristics:

- With the addition of localized data, the same executable can run worldwide.
- Textual elements, such as status messages and the GUI component labels, are not hardcoded in the program. Instead they are stored outside the source code and retrieved dynamically.
- Support for new languages does not require recompilation.
- Culturally-dependent data, such as dates and currencies, appear in formats that conform to the end user's region and language.
- It can be localized quickly.

# Java i18n Demo

```
import java.util.Locale;
import java.util.ResourceBundle;

public class Hello {

    public static void main(String[] args) {
        String language = "en";
        String country = "US";

        if (args.length == 1) {
            language = args[0];
        } else if (args.length == 2) {
            language = args[0];
            country = args[1];
        }

        var locale = new Locale(language, country);
        var messages = ResourceBundle.getBundle("messages", locale);

        System.out.print(messages.getString("hello") + " ");
        System.out.println(messages.getString("world"));
    }
}
```

messages\_en.properties

```
hello=Hello(en)  
world=World
```

messages\_en\_US.properties

```
world=World(en_US)
```

messages\_es.properties

```
hello=Hola  
world=Mundo
```

execute java

```
java Hello.java  
java Hello.java es
```

```
Hello(en) World(en_US)  
Hola Mundo
```

# Java i18N workflow

## 1. Create the Properties Files

```
greetings = Hello  
farewell = Goodbye  
inquiry = How are you?
```

## 2. Define the Locale

```
aLocale = new Locale("en","US");
```

## 3. Create a ResourceBundle

```
messages = ResourceBundle.getBundle("MessagesBundle", currentLocale);
```

```
MessagesBundle_en_US.properties  
MessagesBundle_fr_FR.properties  
MessagesBundle_de_DE.properties
```

## 4. Fetch the Text from the ResourceBundle

```
String msg1 = messages.getString("greetings");
```

How does an internationalized program identify the appropriate language and region of its end users?

It references a Locale object.

# Locale in i18N

Locale is the user-specific location and cultural information managed by a computer. [\(RFC6365\)](#)

A concept or identifier used by programmers to represent a particular collection of cultural, regional, or linguistic preferences.



# Tags for Identifying Languages(BCP 47)

# i18N IETF Standard

- Terminology Used in Internationalization in the IETF
- IETF BCP<sub>Best Current Practice</sub> 47 Language Tag Registry Update (LTRU)
- Making Sense of Language Tags

# Locale in Java

java.util.Locale

- Implements IETF BCP 47
  - RFC 4647: Matching of Language Tags
    - *Filtering* is used to get all matching locales
    - *lookup* is to choose the best matching locale
  - RFC 5646: Tags for Identifying Languages
- Refers to IETF RFC 2616
  - Quality Values
- Refers to ISO
  - ISO 639: Language codes
  - ISO 3166: Country codes
  - ISO 15924: Script code

How does Java get messages by locale identify?

It's *ResourceBundle*!

# ResourceBundle in Java

[java.util.ResourceBundle](#)

# Others for i18N

- Common Language Data Repository (CLDR)<sup>Incorporated into JDK 8</sup>
  - Locale-specific patterns for formatting and parsing: dates, times, timezones, numbers and currency values, measurement units,...
  - Translations of names: languages, scripts, countries and regions, currencies, eras, months, weekdays, day periods, time zones, cities, and time units, and sequences (and search keywords),...
  - Language & script information: characters used; plural cases; gender of lists; capitalization; rules for sorting & searching; writing direction; transliteration rules;...
  - Country information: language usage, currency information, calendar preference, week conventions,...
  - Validity: Definitions, aliases, and validity information for Unicode locales, languages, scripts, regions, and extensions,...
- UNICODE LOCALE DATA MARKUP LANGUAGE (LDML)

# Outside of Java

- GUN gettext
  - C
  - C++
  - Python
  - PHP
  - Elixir
- ICU
  - Code Page Conversion
  - Collation
  - Formatting(CLDLDR)
  - Time Calculations
  - Unicode Support
  - Regular Expression
  - Bidi

# Further reading list

- [Building a minimal i18n library](#)
- [Clojure uses standard Java ResourceBundle](#)
- [awesome-i18n](#)
- [awesome-i18n](#)
- [A Beginner's Guide to Internationalization in Java](#)
- [国际化与本地化](#)
- [国际化分析与处理](#)



