GO FOR THE MONEY! JSR-354

A QUICK INTRODUCTION TO THE JAVA MONEY AND CURRENCY API

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ABOUT ME

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AGENDA

Intro

API

Code

Wrap-up
INTRO
A large proportion of the computers in this world manipulate money, so it’s always puzzled me that money isn’t actually a first class data type in any mainstream programming language. The lack of a type causes problems, the most obvious surrounding currencies...

Martin Fowler
- float, double (since Java 1)
- java.math.BigDecimal (since Java 1.1)
- java.text.DecimalFormat (since Java 1.1)
- java.util.Currency (since Java 1.4)
Monetary values are a key feature for many applications.

- `java.util.Currency` is a structure for ISO-4217 only.
- No standard value type to represent a monetary amount.
- No support for currency arithmetic or conversion.
- No support for historic or virtual currencies.
- `java.text.DecimalFormat` lacks flexibility.
REQUIREMENTS

- Easy addition and modification of currencies
- Currencies need a context and should be client-aware
- Standard API for money amounts, rounding, conversions
- Easy, flexible, complex, individual formatting and parsing
- Clearly defined extension points
- Follow the design principles of the Java platform
- Compatibility with Standard Edition and Micro Edition
- No external dependencies
- Interoperability with existing artifacts
- Support functional programming style
FOUR YEARS OF HARD WORK

- JSR-354 started early 2012
- JSR-354 early draft review in 2013
- Reference implementation startet late 2013
- Final release of JSR-354 early 2015
- Final release of reference implementation early 2015
API
CURRENCIES

- **Monetary**
  - Get a currency by code or locale
  - Additional API for complex queries
  - Supports SPI to enhance functionality

- **CurrencyUnit**
  - Currency code (string and number)
  - Additional context information (e.g. type, capabilities)

- **CurrencyQueryBuilder**
  - Builder for complex queries for accessing currency units
MONETARY AMOUNTS

- **Monetary**
  - Get a monetary amount by currency and value
  - Optionally specify an explicit factory
  - Or query for a suitable factory
  - Supports SPI to enhance functionality

- **MonetaryAmount**
  - Numeric value and currency
  - Arithmetic operations to do calculations
  - Multiple implementations
  - Interoperability rules
  - Additional context information (e.g. capabilities)

- **MonetaryAmountFactoryQueryBuilder**
  - Builder for complex queries for accessing monetary amount factories
- **Monetary**
  - Get a rounding operator
  - Optionally specify a locale
  - Or query for a suitable rounding operator
  - Supports SPI to enhance functionality

- **MonetaryRounding**
  - Extends `MonetaryOperator`
  - Multiple implementations
  - Additional context information

- **RoundingQueryBuilder**
  - Builder for complex queries for accessing rounding operators
CONVERSION WITH CURRENCY CONVERSION

- **MonetaryConversions**
  - Get a currency conversion by currency code or unit
  - Or query for a suitable currency conversion
  - Supports SPI to enhance functionality

- **CurrencyConversion**
  - Multiple implementations
  - Source and target currency
  - Conversion factor
  - Additional context information
  - Unidirectional

- **ConversionQueryBuilder**
  - Builder for complex queries for accessing currency conversions
CONVERSION WITH EXCHANGE RATE PROVIDER

- MonetaryConversions
  - Get an exchange rate provider
  - Or query for a suitable currency conversion
  - Supports SPI to enhance functionality

- ExchangeRateProvider → ExchangeRate
  - Multiple implementations
  - Source and target currency
  - Conversion factor
  - Additional context information
  - Unidirectional

- ConversionQueryBuilder
  - Builder for complex queries for accessing exchange rate providers
FORMATTING AND PARSING

- **MonetaryFormats**
  - Get a monetary amount format
  - Optionally specify a locale
  - Or query for a suitable monetary amount format
  - Supports SPI to enhance functionality

- **MonetaryAmountFormat**
  - Multiple implementations
  - Additional context information
  - Format monetary amounts
  - Parse monetary amounts

- **AmountFormatQueryBuilder**
  - Builder for complex queries for accessing monetary amount formats
CODE
Code
Demo Application Walkthrough
WRAP-UP
Money Validation by Zalando

- Validate monetary amounts
- Uses existing, standardized constraints
- Offers additional, more expressive custom constraints
- Can be use with any Bean Validation implementation

```java
1 @Min
2 @Max
3 @DecimalMin
4 @DecimalMax
5 @Positive
6 @PositiveOrZero
7 @Negative
8 @NegativeOrZero
9 @Zero
```
COMPATIBILITY

- Supports
  - Java Micro Edition
  - Java Standard Edition
  - Java Enterprise Edition

- Compatible with Java 8+
- Backport available for Java 7
<dependency>
  <groupId>javax.money</groupId>
  <artifactId>money-api</artifactId>
  <version>1.0.1</version>
</dependency>

<dependency>
  <groupId>org.javamoney</groupId>
  <artifactId>moneta</artifactId>
  <version>1.1</version>
</dependency>
build.gradle

```groovy
compile(
    'javax.money:money-api:1.0.1',
    'org.javamoney:moneta:1.1'
)
```
- Java Money Umbrella Site
  http://javamoney.org/
- JSR-354 Specification
  http://javamoney.github.io/api.html
- JSR-354 Reference Implementation
  http://javamoney.github.io/ri.html
- JSR-354 Technical Compatibility Kit
  http://javamoney.github.io/tck.html
- Java Money Financial Library
  http://javamoney.github.io/lib.html
- Money Validation
  https://github.com/zalando/money-validation
Thank You! Questions?