

# Go for the Money! JSR-354

A quick introduction to the Java Money and Currency API

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# Slides, Code, Video



<http://fihlon.ch/jfs17>

# About Me

- **Software Engineer**

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- **Agile Coach**

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- **Lecturer**

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- **Speaker**

Conferences, User Groups, Meetups

- **Author**

Articles, Books



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# What to expect

- **History**

A brief retrospect in time.

- **Motivation**

Why do we need a new API?

- **Requirements**

Requirements for the new API.

- **Boring slides**

Some theoretic stuff about the JSR-354.

- **Source code**

Because we are hackers!

- `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)

# Motivation

- Monetary values are a key feature for many applications
- `java.util.Currency` is a structure for ISO-4217 only
- No support for historic or virtual currencies
- No support for currency arithmetic or conversion
- No standard value type to represent a monetary amount
- `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 artefacts
- Support **functional** programming style



## Three years of hard work

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

Highway of slides...

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## ■ 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

## ■ `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



# Live Coding

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## Wrap-up

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# Interfaces

- `CurrencyConversion`
- `CurrencySupplier`
- `CurrencyUnit`
- `ExchangeRate`
- `ExchangeRateProvider`
- `ExchangeRateProviderSupplier`
- `MonetaryAmount`
- `MonetaryAmountFormat`
- `MonetaryOperator`
- `MonetaryQuery`
- `MonetaryRounding`
- `NumberSupplier`

## Service Provider Interfaces

- `CurrencyProviderSpi`
- `MonetaryAmountFactoryProviderSpi`
- `MonetaryAmountFormatProviderSpi`
- `MonetaryAmountsSingletonQuerySpi`
- `MonetaryAmountsSingletonSpi`
- `MonetaryConversionsSingletonSpi`
- `MonetaryCurrenciesSingletonSpi`
- `MonetaryFormatsSingletonSpi`
- `MonetaryRoundingsSingletonSpi`
- `RoundingProviderSpi`

## 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

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

- Supports
  - Java Micro Edition
  - Java Standard Edition
  - Java Enterprise Edition
- Compatible with Java 8+
- Backport available for Java 7

## pom.xml

```
1 <dependency>
2     <groupId>javax.money</groupId>
3     <artifactId>money-api</artifactId>
4     <version>1.0.1</version>
5 </dependency>
6 <dependency>
7     <groupId>org.javamoney</groupId>
8     <artifactId>moneta</artifactId>
9     <version>1.1</version>
10 </dependency>
```

## build.gradle

```
1 compile(  
2     'javax.money:money-api:1.0.1',  
3     'org.javamoney:moneta:1.1'  
4 )
```



- 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?



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