Nuclet: ECB - Exchange rates (not yet available)

Language: Deutsch · **English**

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> **Data sheet and documentation entry point for the Exchange Rates Nuclet (currency conversion and daily exchange-rate updates via the ECB interface).**

CONCEPT | INTEGRATORS | UPDATED: JUL 2026 | APPLIES TO NUCLOS 4.2026.X

On this page

> **Machine-translated – under review**
>
> This page was machine-translated from German as a first draft and is currently under review. The authoritative source remains the **German original** (see the language switch above).

Nuclet for currency conversions and exchange rate functionality

Name:	Exchange Rates
Package:	org.nuclet.exchangerates
Version:	1.4.0
Date:	13.09.2017
Nuclos compatibility:	from Nuclos 4.19.3

> **Prerequisites**
>
> The exchange rates Nuclet no longer contains a currency business object. A currency business object must therefore exist in the target Nuclet or be created as part of an integration. It is absolutely necessary for this currency business object that an attribute exists in which the three-digit ISO 4217 currency code is stored as an identifying feature (see also Wikipedia). For further requirements on the currency business objects, please refer to the "Integration" section on this page.
>
> It is possible and intended to use the currency from the Currency Nuclet .

Overview

Short description

The exchange rates Nuclet offers the option

- to maintain exchange rates
- to convert currency amounts from one currency into another
- to have exchange rates updated daily via an interface at the European Central Bank (ECB)

The exchange-rate Nuclet was previously bundled with the currency Nuclet ("Currency"); the currency business objects have now been separated from the exchange-rate functionality.

The exchange rates Nuclet is suitable for working together with all currency business objects.

Nuclet components

Within the .nuclet file, the Currency Nuclet comprises

- two business objects (for exchange rates and a currency converter),
- two layouts,
- various Java rules (distributed across packages),
- two job controls (for controlling the ECB interface on the one hand, for tests on the other),
- a structure definition (for importing master data) and
- one Nuclet dependency.

In addition, the following components are supplied in the ZIP file:

- a CSV file for object imports

Type	Name, English	Name, German	Short description
Business object	Currency Converter	Currency converter	
	Exchange Rate	Exchange rate	
Layout	Currency Converter		Layout for business object „Currency Converter“
	Exchange Rate		Layout for the business object „Exchange Rate“
Java package	org.nuclet.exchangerates.facade		Java rules for database access per business object
	org.nuclet.exchangerates.job		Java rules for controlling jobs ("job control")
	org.nuclet.exchangerates.logic		Business logic
	org.nuclet.exchangerates.rule		Rules for insert, update and delete events
	org.nuclet.exchangerates.test		Java rules for controlling tests
	org.nuclet.exchangerates.wrapper		wrapper classes as a Nuclet interface
	org.nuclet.exchangerates.xml		XML parser functionality for the ECB interface
Job control	Currency Converter Test		Test job for currency conversions
	ECB Exchange Rates		Scheduled job for updating exchange rates
Structure definition	Currency Converter		Import structure for business object „Currency Converter“
Nuclet dependency	org.nuclet.Common		general helper functionality
Object import	Currency_Converter.csv		Master data records for business object „Currency Converter“

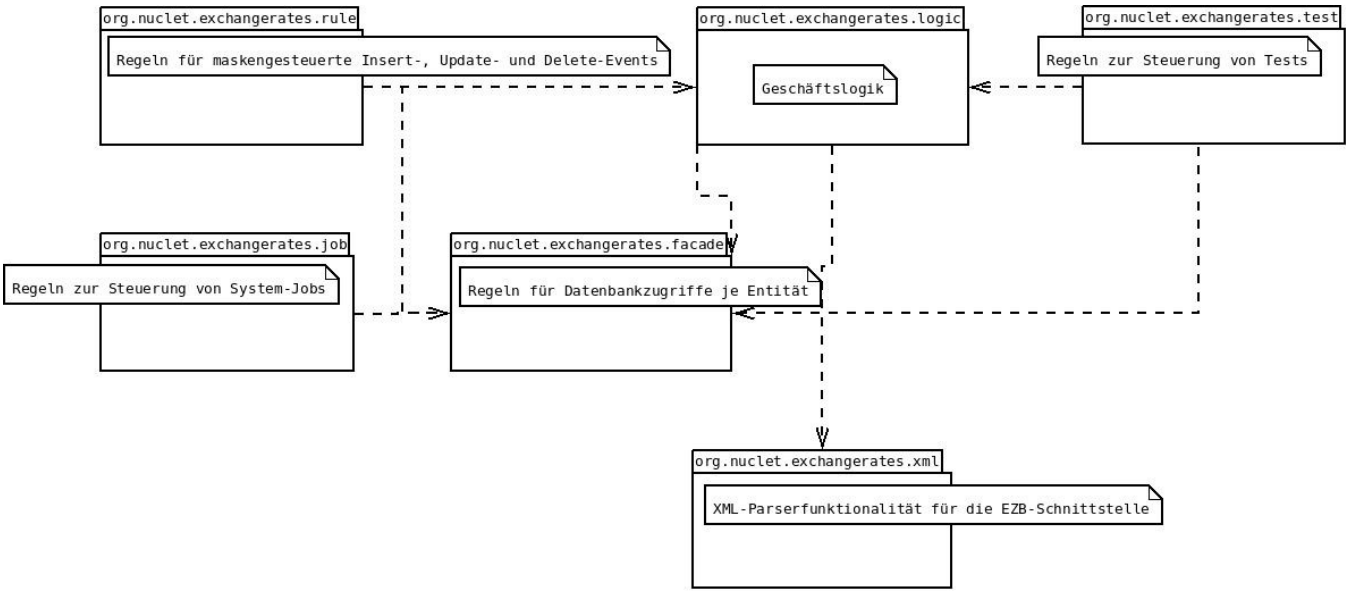
Table 1: Nuclet components

Java package structure

The Java rules are divided into seven packages:

- Rules for form-controlled events (org.nuclet.exchangerates.rule)
- Rules for controlling system jobs (org.nuclet.exchangerates.job)
- Rules for the business logic (org.nuclet.exchangerates.logic)
- Facade classes for executing database queries per entity (org.nuclet.exchangerates.facade)
- Rules for reading in and processing MT940 files (org.nucletexchangerates.xml)
- Rules for executing tests (org.nuclet.exchangerates.test)
- Wrapper classes as a Nuclet interface (org.nuclet.exchangerates.wrapper)

The dependencies of the packages are illustrated in the following figure.



The exchange rates Nuclet is fully functional on the Java side. Here is an overview of the Java classes distributed across the individual packages:

Java package	Java class	Short description
org.nucket.exchangerates.facade	AbstractCurrencyFacade	interface definition for database access to a currency business object
	CurrencyFacade	concrete implementation for database access to a currency business object
	CurrencyFacadeFactory	factory class for the CurrencyFacade
	ExchangeRateFacade	database access to the business object „Exchange Rate“
org.nuclet.exchangerates.job	EcbExchangeRateImporter	importer class for the ECB interface
	EcbExchangeRatesJob	job for calling the ECB interface import
org.nuclet.exchangerates.logic	CurrencyConverterLogic	logic for currency conversions
	CurrencyLogic	validation logic for currencies
org.nuclet.exchangerates.rule	ConvertCurrencyAmount	conversion in the currency converter form
	ValidateBaseCurrency	validations regarding the existence of a base currency
	SwapCurrencies	currency swap (base and target currency) in the currency converter form
org.nuclet.exchangerates.test	CurrencyConverterTest	test class for testing currency conversions
	CurrencyConverterTestJob	job for calling the test of currency conversions
org.nuclet.exchangerates.wrapper	AbstractCurrencyWrapper	wrapper object for interface definition on a currency business object
	CurrencyWrapper	concrete implementation of the wrapper object for currencies
org.nuclet.exchangerates.xml.sax	EcbExchangeRate	wrapper class for the import via the ECB interface
	EcbExchangeRateHandler	XML handler for the ECB interface

Table 2: Java package structure

Application-specific adjustments should generally not be necessary in the Java rules.

Integration

Necessary integration steps

The integration of the exchange rates Nuclet takes place in 10 steps:

1. Download
2. Nuclet import
3. Create a currency business object or import the Currency-Nuclets
4. Adjustments in the business object
5. Create object import
6. Run object import
7. Assignment of rules in the rule management
8. adjustments in the Java rules
9. Layout adjustments
10. read in current exchange rates

All integration steps are explained in detail below.

Step 1: Download

Download the ZIP file „Exchange_Rates-v1.4.0_4.19.3.zip“ from the Nuclos web page under „Nuclos Services“ > „Download“ > „Nuclet Download“. Then unpack the ZIP locally.

Step 2: Nuclet import

Import the Exchange Rates Nuclet under „Configuration“ > „Nuclet Management“ > „Import“ into your existing Nuclos instance, selecting the file „Exchange_Rates-v1.4.0-4.19.3.nuclet“

Messages during the import

During the import, the following four warnings will appear:

- Businessobject Currency Converter references to unknown businessobject Currency. Redirect to dummy businessobject!
- Businessobject Currency Converter references to unknown businessobject Currency. Redirect to dummy businessobject!
- Businessobject Exchange Rate references to unknown businessobject Currency. Redirect to dummy businessobject!
- Businessobject Exchange Rate references to unknown businessobject Currency. Redirect to dummy businessobject!

The reason is: the currency business object as reference business object is missing in the business objects "Exchange rate" and "Currency converter".

More on this in step 4.

Step 3: Create a currency business object or import the Currency Nuclet

The prerequisite for the exchange rates Nuclet to function is the existence of a currency business object with the following mandatory fields:

Attribute	Data type	Function	Implementation in the Currency Nuclet
ISO-4217-Code	Text	Identification of the currency via the three-digit currency code (see Wikipedia)	iso4217Code
Number of decimal places	Integer	the number of decimal places of the currency system determines the decimal places of the exchange rates	numberOfDigits
Base currency?	Yes/No	Definition of a system-unique base currency (here: EUR)	isBaseCurrency

The currency business object "Currency" in the Currency Nuclet meets these requirements.

The attributes do not have to be named as specified here. A matching data typing, however, is important. A mapping of the actually used attributes of the currency business objects from the target Nuclet to the interface attributes then takes place in step 8a).

Step 4: Adjustments in the business object

Via the business object, the currency business object actually used must then be entered as a reference business object into the attributes "Base currency" and "Target currency" of the two business objects "Exchange rate" and "Currency converter".

Step 5: Create object import

Steps 5 and 6 are only necessary if the supplied currencies are to be imported into the target system. However, the prerequisite for the function of the Nuclet is the existence of two currencies EUR and USD.

Create an object import („Configuration“ > „Import & Export“) for the structure definition „Currency Converter“. The supplied CSV file „Currency_Converter.csv“ (found in the „data“ subdirectory of the ZIP file) can be used for this.

Step 6: Run object import

When the created object import is run, a currency converter object is created.

> ⚠ **Caution:** The prerequisite is the existence of the two currencies EUR and USD.

Step 7: Assignment of rules in the rule management

Via the rule management, the Java rule **ValidateBaseCurrency** must be assigned to the actually used currency business object**:**

Source Nuclet	Rule type	Rule	Target Nuclet	Business object
ExchangeRates	Aktualisieren	ValidateBaseCurrency	*the Nuclet in which the currency business object you actually use is located*	*your own currency business object*
ExchangeRates	Anlegen	ValidateBaseCurrency	*the Nuclet in which the currency business object you actually use is located*	*your own currency business object*
ExchangeRates	Delete	ValidateBaseCurrency	*the Nuclet in which the currency business object you actually use is located*	*your own currency business object*

Step 8: Adjustments in the Java rules

The exchange rates Nuclet works with any currency business object, therefore some adjustments in the Java rules must be carried out during an integration:

	Java package	Java rule	Short description
a	org.nuclet.exchangerates.wrapper	CurrencyWrapper	Wrapper object for currencies, i.e. here an interface to the actually used currency business object is defined
b	org.nuclet.exchangerates.facade	CurrencyFacade	Definition of necessary database access to the actually used currency business object
c	org.nuclet.exchangerates.rule	ValidateBaseCurrency	Use of the wrapper object defined in 8a), i.e. the business object of the currency business object from the RuleContext is "wrapped"

a) CurrencyWrapper

The class CurrencyWrapper serves as a Nuclet interface to the actually used currency business object. The methods and the constructor of the class must be filled with application-specific behaviour. Examples are given in comment blocks; these examples must therefore be adapted during integration to the actually used currency business object (or its BusinessObject class).

org.nuclet.exchangerates.wrapper.CurrencyWrapper

```
package org.nuclet.exchangerates.wrapper;


import org.nuclos.api.businessobject.BusinessObject;

// @replace
//
// mit eigenem Code zu ersetzen, Beispiel:
//
// import org.nuclet.currency.Currency;


/**
 * Konkrete Wrapper-Klasse für Währungsobjekte
 *
 */
public class CurrencyWrapper extends AbstractCurrencyWrapper
{
    public CurrencyWrapper(final BusinessObject currency)
    {
        // @replace Bitte bei Nuclet-Integration mit eigenem Code ersetzen!
        //
        // Beispiel:
        //
```

```
        // if (currency instanceof Currency) {
        //    this.businessObject = currency;
        // }
    }

    /**
     * Liefert die Datenbank-ID des Währungsobjektes.
     */
    public Long getId()
    {
        return this.businessObject.getId();
    }

    /**
     * Liefert den ISO-4217-Code des Währungsobjektes.
     * @see https://de.wikipedia.org/wiki/ISO_4217
     * @see https://en.wikipedia.org/wiki/ISO_4217
     */
    public String getIso4217Code()
    {
        // @replace Bitte bei Nuclet-Integration mit eigenem Code ersetzen!
        //
        // Beispiel:
        //
        // return ((Currency)this.businessObject).getIso4217Code();

        return null;
    }

    /**
     * Liefert die Anzahl der Nachkommastellen im Währungssystem der Währung
     *
     * @return die Anzahl der Nachkommastellen im Währungssystem der Währung
     */
    public Integer getNumberOfDigits()
    {
        // @replace Bitte bei Nuclet-Integration mit eigenem Code ersetzen!
        //
        // Beispiel:
        //
        // return ((Currency)this.businessObject).getNumberOfDigits();

        return null;
    }

    /**
     * Yields information, if the currency is marked as "base currency"
     *
     * @return true, falls die Währungs als "base currency" markiert ist
     */
    public Boolean getIsBaseCurrency()
    {
        // @replace Bitte bei Nuclet-Integration mit eigenem Code ersetzen!
        //
        // Beispiel:
        //
        // return ((Currency)this.businessObject).getIsBaseCurrency();

        return null;
    }
}
```

b) CurrencyFacade

In the class CurrencyFacade, the methods getBaseCurrencies() and getCurrencyByIso4217Code() must be filled with application-specific behaviour. An example is given in a comment block; this example must be adapted to the actually used currency business object (or its BusinessObject class).

org.nuclet.exchangerates.facade.CurrencyFacade

```
package org.nuclet.exchangerates.facade;


import java.util.ArrayList;
import java.util.List;

import org.nuclos.api.businessobject.Query;
import org.nuclos.api.businessobject.QueryOperation;
import org.nuclos.api.businessobject.SearchExpression;
import org.nuclos.api.context.JobContext;
import org.nuclos.api.context.RuleContext;
import org.nuclos.api.exception.BusinessException;
import org.nuclos.api.provider.QueryProvider;
import org.nuclos.api.provider.BusinessObjectProvider;

import org.nuclet.exchangerates.wrapper.AbstractCurrencyWrapper;
import org.nuclet.exchangerates.wrapper.CurrencyWrapper;

// @replace! Bitte bei Nuclet-Integration mit eigenem Code ersetzen!
//
// Beispiel:
//
// import org.nuclet.currency.Currency;


/**
 * Facade for Business Objects of type "Currency"
 *
 */
public class CurrencyFacade extends AbstractCurrencyFacade
{
    public CurrencyFacade(final JobContext jobContext)
    {
        super(jobContext);
    }

    public CurrencyFacade(final RuleContext ruleContext)
    {
        super(ruleContext);
    }

    /**
     * Liefert die Singleton-Instanz dieser Klasse
     *
     */
    public static CurrencyFacade getInstance(final JobContext jobContext)
    {
        return new CurrencyFacade(jobContext);
    }

    public static CurrencyFacade getInstance(final RuleContext ruleContext)
    {
        return new CurrencyFacade(ruleContext);
    }

    /**
     * Fetches all currencies marked as "base currency" from the database and returns
     * a list of wrapped currency objects
     *
     * @return a list of wrapped currency objects
     */
    protected List<AbstractCurrencyWrapper> getBaseCurrencies() throws BusinessException
    {
        // @replace! Bitte bei Nuclet-Integration mit eigenem Code ersetzen!
        //
        // Beispiel:
        //
```

```
        // final Query<Currency> queryGetBaseCurrency = QueryProvider.create(Currency.class);
        // queryGetBaseCurrency.where(new SearchExpression(Currency.IsBaseCurrency, Boolean.TRUE,
QueryOperation.EQUALS));
        //
        // final List<Currency> lstBaseCurrencies = QueryProvider.execute(queryGetBaseCurrency);
        // final List<AbstractCurrencyWrapper> lstWrappedBaseCurrencies = new
ArrayList<AbstractCurrencyWrapper>();
        //
        // for (final Currency currency : lstBaseCurrencies) {
        //     lstWrappedBaseCurrencies.add(new CurrencyWrapper(currency));
        // }

        // return lstWrappedBaseCurrencies;

        return null;
    }

    /**
     * Fetches the currency which determined by a given ISO 4217 code from the database
     *
     * @param strIso4217Code the ISO 4217 code of the currency to be found
     *
     * @return the currency which is marked as "base currency" from the database
     * @throws BusinessException, if more than one currency-objects are found
     */
    public AbstractCurrencyWrapper getCurrencyByIso4217Code(final String strIso4217Code)
    {
        // @replace! Bitte bei Nuclet-Integration mit eigenem Code ersetzen!
        //
        // Beispiel:
        //
        //  final Query<Currency> queryGetCurrency = QueryProvider.create(Currency.class);
        //  queryGetCurrency.where(Currency.Iso4217Code.eq(strIso4217Code));
        //
        //  final List<Currency> listCurrency = QueryProvider.execute(queryGetCurrency);
        //
        //  if (listCurrency != null && listCurrency.size() > 0) {
        //     return new CurrencyWrapper(listCurrency.get(0));
        //  } else {
        //      return null;
        //  }

        return null;
    }



}
```

c) ValidateBaseCurrency

In the rule ValidateBaseCurrency, the BusinessObject class of the actually used currency object must be entered.

org.nuclet.exchangerates.rule.ValidateBaseCurrency

```
package org.nuclet.exchangerates.rule;

import org.nuclos.api.rule.DeleteRule;
import org.nuclos.api.rule.InsertRule;
import org.nuclos.api.rule.UpdateRule;
import org.nuclos.api.context.DeleteContext;
import org.nuclos.api.context.InsertContext;
import org.nuclos.api.context.RuleContext;
import org.nuclos.api.context.UpdateContext;
import org.nuclos.api.annotation.Rule;
import org.nuclos.api.exception.BusinessException;
import org.nuclos.api.provider.BusinessObjectProvider;
import org.nuclos.api.provider.QueryProvider;
```

```
import org.nuclet.common.rule.AbstractRule;

import org.nuclet.exchangerates.logic.CurrencyLogic;
import org.nuclet.exchangerates.wrapper.AbstractCurrencyWrapper;
import org.nuclet.exchangerates.wrapper.CurrencyWrapper;

// @replace! Bitte bei Nuclet-Integration mit eigenem Code ersetzen!
//
// Beispiel:
//
// import org.nuclet.currency.Currency;

/**
 * @name ValidateBaseCurrency
 * @description Checks if exactly one base currency is declared
 * @usage
 * @change
 *
 *
 */
@Rule(name="ValidateBaseCurrency", description="Checks if exactly one base currency is declared")
public class ValidateBaseCurrency extends AbstractRule implements InsertRule, UpdateRule, DeleteRule
{
    public void insert(InsertContext context) throws BusinessException
    {
        // @replace Bitte bei Nuclet-Integration mit eigenem Code ersetzen!
        //
        // Beispiel:
        //
        // validateBaseCurrency(context, new CurrencyWrapper(context.getBusinessObject(Currency.class)));
    }

    public void update(UpdateContext context) throws BusinessException
    {
        // @replace Bitte bei Nuclet-Integration mit eigenem Code ersetzen!
        //
        // Beispiel:
        //
        // validateBaseCurrency(context, new CurrencyWrapper(context.getBusinessObject(Currency.
class)));
    }

    public void delete(DeleteContext context) throws BusinessException
    {
        // @replace Bitte bei Nuclet-Integration mit eigenem Code ersetzen!
        //
        // Beispiel:
        //
        // validateBaseCurrency(context, new CurrencyWrapper(context.getBusinessObject(Currency.
class)));
    }


    private void validateBaseCurrency(final RuleContext context,
        final AbstractCurrencyWrapper currency) throws BusinessException
    {
        initialize(context);

        final CurrencyLogic currencyLogic = new CurrencyLogic(context);
        currencyLogic.validateCurrency(currency);
    }
}
```

Step 9: Layout adjustments

In the "Currency" layout you can embed the exchange rates as a subform.

Step 10: read in current exchange rates

Via the job **ECB Exchange Rates** the currently valid exchange rates can now be read in. Only those currencies that are present in the system are taken into account.

Usage

Setting up the job control

1. Open the job control „ECB Exchange Rates“ under „Administration“ > „Job control“
2. Configure start date, start time, interval, e-mail notification and options for deleting the log info.
3. Activate the job control if the job is to be run automatically at the configured interval. Alternatively, the job can also be run manually via the job control.

Operation

1. The imported data is stored in the business object for exchange rates („Exchange Rate“).
2. The forms for currencies and exchange rates can be found under the menu item „Wechselkurse“. This can be changed at any time via the business object.
3. The currency converter can also be found under the menu item „Wechselkurse“. If you do not want to use it, you can remove it from the menu via the business object.
4. The Nuclet is currently set up so that all exchange rates are displayed in the base currency of the system. Since the update runs via the ECB interface, the Euro (EUR) is stored as the base currency. You can also easily set up the Nuclet so that the exchange rate to the Euro is displayed in each currency: to do so, open the layout „Currency“ and change the entered value in the field „Fremdschlüssel“ (subform „Exchange Rates“) from „baseCurrency“ to „counterCurrency“.

Setting up user permissions (optional)

Access rights for existing user groups to layouts, business objects, attributes and attribute groups can be set in Nuclos in the usual three ways (see https://wiki.nuclos.de):

1. general settings for business objects under "Administration" > "User groups"
2. status-dependent settings for attributes/attribute groups under "Configuration" > "State model"
3. record-specific settings under "Configuration" > "Data sources" > "Record sharing"

Tests

- The currency converter form is available for simple tests of currency conversions.
- For advanced tests of currency conversions, please use the class org.nuclet.currency.test.CurrencyConverterTest. You are welcome to adapt and extend it to your own needs. The class is called by org.nuclet.currency.test.CurrencyConverterTestJob, and this can be run via the job control „Currency Converter Test“ as needed (preferably manually).

Versions

Version	Date	Type	Changes
1.0.0	12.08.2013	initial version	Separation of exchange rate functionality and currency business object from the Currency Nuclet
1.0.1	08.10.2013	Bug fixes and enhancements	see Release Notes
1.1.0	08.01.2014	Migration to Nuclos 4.0	Migration to Nuclos 4.0
1.2.0	25.03.2017	Migration to Nuclos 4.13	Migration to Nuclos 4.13
1.3.0	08.08.2017	Migration to Nuclos 4.18	Migration to Nuclos 4.18
1.4.0	13.09.2017	Migration to Nuclos 4.19	Migration to Nuclos 4.19

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