# Mews Salesforce developer task

The task is to implement an ExchangeRateProvider for Czech National Bank. Find data source on their web - part of the task is to find the source of the exchange rate data and a way how to extract it from there.
The solution has to be buildable, runnable and the program should output the obtained exchange rates.
The goal is to implement all Exchange rates from and to Czech Koruna in a table format so that your end user is always aware of the latest exchange rates (updated once per day).
To submit your solution, just open a new pull request to this repository.
Please write the code like you would if you needed this to run on production environment and had to take care of it long-term.

https://github.com/MewsSystems/developers/tree/master/jobs/Salesforce

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**Requirements from the business:**
Create an Exchange Rate Provider, showing the exchange rates from Czech National Bank, from and to Czech Koruna in a table format.

**Ticket**:
As a user of the system I would like to be able to see all the exchange rates from Czech National Bank from and to Czech Koruna in a table format - through Salesforce Native UI.

**Acceptance criteria:**
1. The data should come from Czech National Bank as a reliable source
2. The data should get updated once a day (time of day was not specified)
3. The table should show all exchange rates from and to Czech Koruna

**Data source:**
Following the documentation on developers.cnb.cz , the following APIs were selected to be used as the data source. The endpoint has the advantage of being publicly accessible (no auth was required).

**Refinement and Tech details:**

1. Salesforce has an out-of-box feature to manage exchange rates, using Multi Currencies. This was not included in the development of this task, as the requirements did not specify the setup of a possible target org. It is important to flag that this is also a storage type in the SF DB. The sObject used by SF for this feature is DatedConversionRate and it can be accessed via apex, flows, data loader, etc for mass update. The table is added

to the DB once the feature is activated.

2. Salesforce current (July 2023) best practices will suggest fulfilling this business requirement in a Scheduled Flow (with a GET request) that will run once a day (time should be given based on business preference) and update records to keep this info within SF DB in Custom Metadata or Custom Object).
   NOTE: Since the task itself called for code to be written, this option was ruled out. Building a flow is a declarative function in SF.

3. Using Apex, make an HTTP request to fetch the data and depending on business needs, store either in Custom Metadata or Custom Object.
   a. Possible Agile approach (if possible):
      i. Fetch the data and store in SF, use native UI in SF to present the data
      ii. Enhance native UI and provide filtering options based on business needs, for ex:
         1. Control the cron from custom metadata - setting the frequency and time of day based on picklist - so it is accessible to admins.
         2. Add visual queues to the UI such as:
            a. Red \ Green arrows to indicate if the rate increased or decreased
            b. Add or replace so UI labels with emojis
         3. Support orgs with multi currency to use their own field mappings
         4. Support more than 1 language with translations
      iii. Use the data within existing business processes to drive business decisions
      iv. Enhance logging around API call to handle errors and re-attempts (custom logger)

**<u>Storing the data in SF</u>**:
- Custom Metadata records
  - Pros:
    - Cached by SF without tapping into Platform Cache partitions
    - Are not counted towards DML limits
  - Cons:
    - Not accessible through native reports, record pages, or list views
    - Requires Setup access to view in native UI, or custom UI component to expose elsewhere if manual intervention is needed (updating the records)
- Custom Object records
  - Pros:
    - Accessible through native reports, record pages, or list views
    - Don’t require Setup access to view and modify through native UI
  - Cons:
    - Take up more space in the DB comparing to Custom Metadata types
    - Not flagged out-of-box to be cached by SF

**<u>Presenting the data in a tabular format on the UI for the end users:</u>**

- Regardless of storage type:
  - Screen Flow (on a record page, an app page or UtilityBar)
  - Lightning Web Cmp (simple \ advance)
- Custom Objects :
  - List View
  - SF Reports

**<u>Security Within SF</u>**:

- CRUD - System Admins + users with appropriate permission set
- R - all other users

**<u>API Call Security:</u>**

- Hardcode value in class\ custom label + Remote Site settings
  - Pros:
    - No need for additional security assignment (Permission sets)
  - Cons:
    - No need for additional security assignment (Permission sets)
    - Values are more likely to have typos
    - Updating endpoints need to take place in more than 1 place
- Named and External Credentials
  - Pros:
    - Each credential can be separated into its own security review (permission set)
    - Endpoints should be updated in one place as pointer vars are used elsewheres
  - Cons:
    - Requires additional setups and know hows

**<u>Package Considerations:</u>**

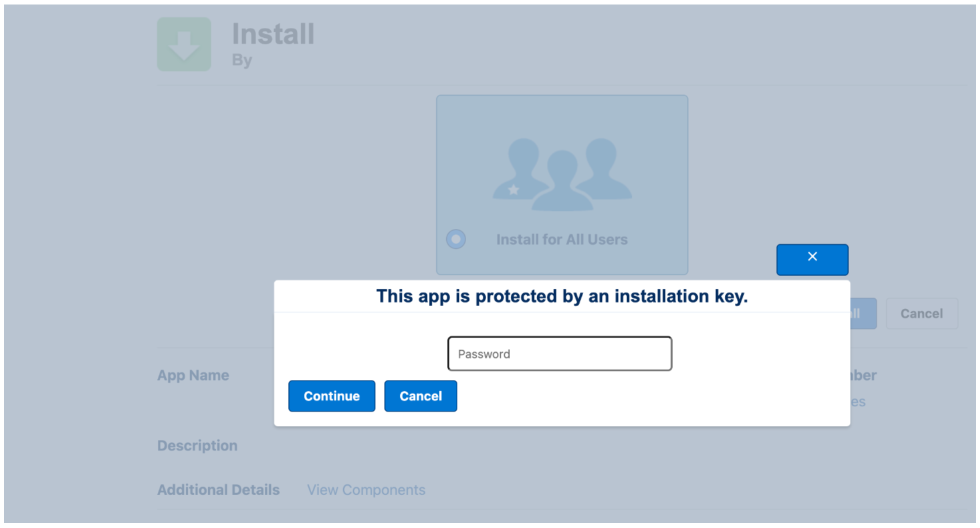
- Count of elements - the less elements, the more likely it will be that people will select this package
- Needs documentations about set up (Setup Manual)
- Job Scheduling - allow for separation of concerns by getting the scheduled class to execute the async context. The new transaction eliminates risks for overall failure based on consecutive transactions.

# Setup Manual

As always, please test the installation and functionality of this package in a fresh sandbox BEFORE installing in production.

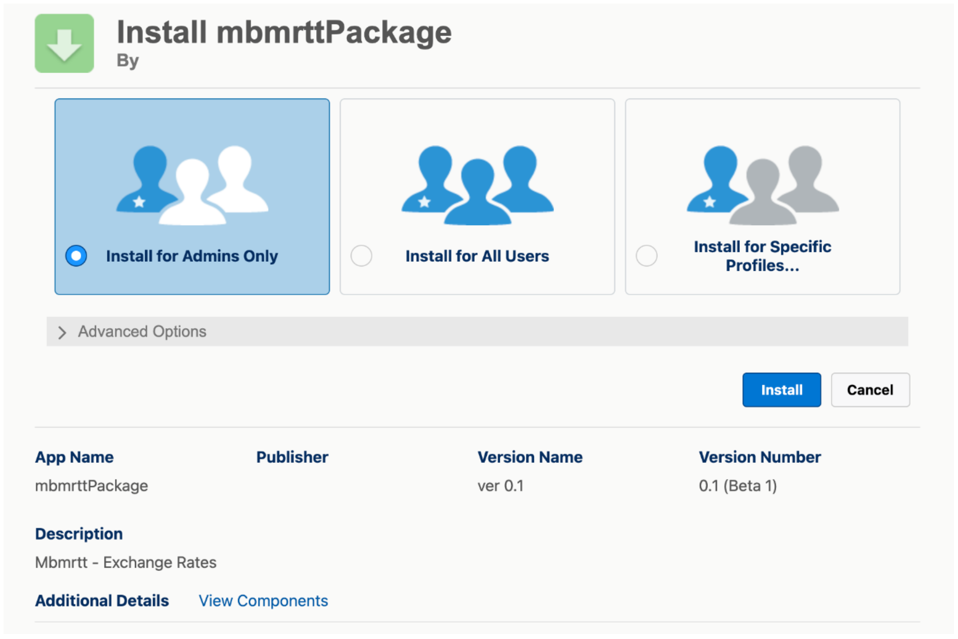
## Installing the package:

1. Use the below links to install in the target org -
   a. Sandbox - https://test.salesforce.com/packaging/installPackage.apexp?p0=04t8d000000u8EcAAI
   b. Production - https://login.salesforce.com/packaging/installPackage.apexp?p0=04t8d000000u8EcAAI
2. Enter the password provided to you



This app is protected by an installation key.

3. Select the target audience of the package.
   As best practice it is recommended to install this app for admins only.


**Install mbmrttPackage**
By

Install for Admins Only [✓] | Install for All Users | Install for Specific Profiles...

Advanced Options

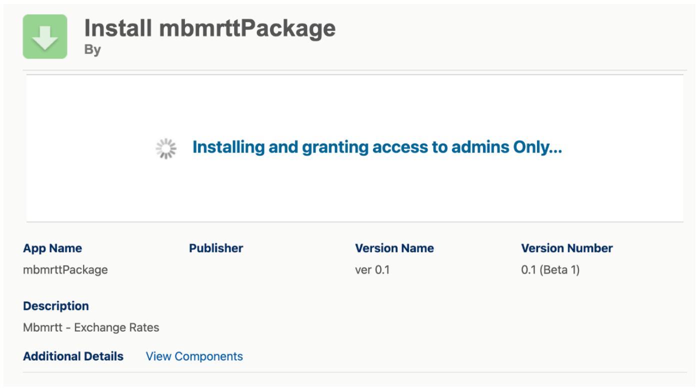
Install | Cancel

| App Name | Publisher | Version Name | Version Number |
|---|---|---|---|
| mbmrttPackage | | ver 0.1 | 0.1 (Beta 1) |

**Description**
Mbmrtt - Exchange Rates

**Additional Details** View Components

4. Allow the installation to complete

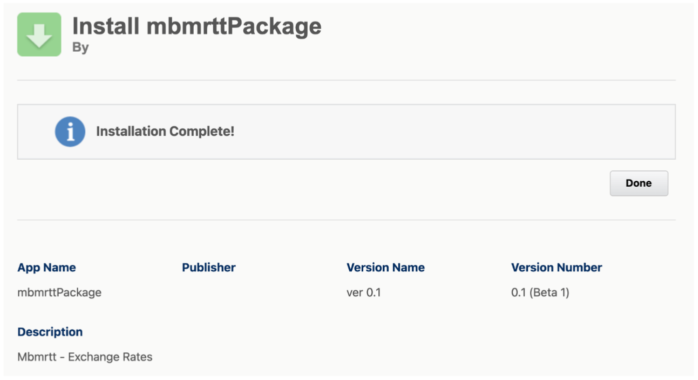

**Install mbmrttPackage**
By

Installing and granting access to admins Only...

| App Name | Publisher | Version Name | Version Number |
|---|---|---|---|
| mbmrttPackage | | ver 0.1 | 0.1 (Beta 1) |

**Description**
Mbmrtt - Exchange Rates

**Additional Details** View Components


**Install mbmrttPackage**
By

Installation Complete!

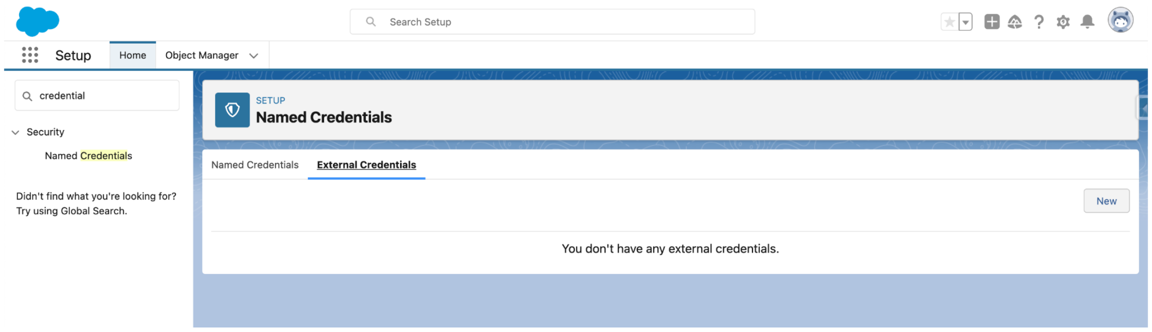
Done

| App Name | Publisher | Version Name | Version Number |
|---|---|---|---|
| mbmrttPackage | | ver 0.1 | 0.1 (Beta 1) |

**Description**
Mbmrtt - Exchange Rates

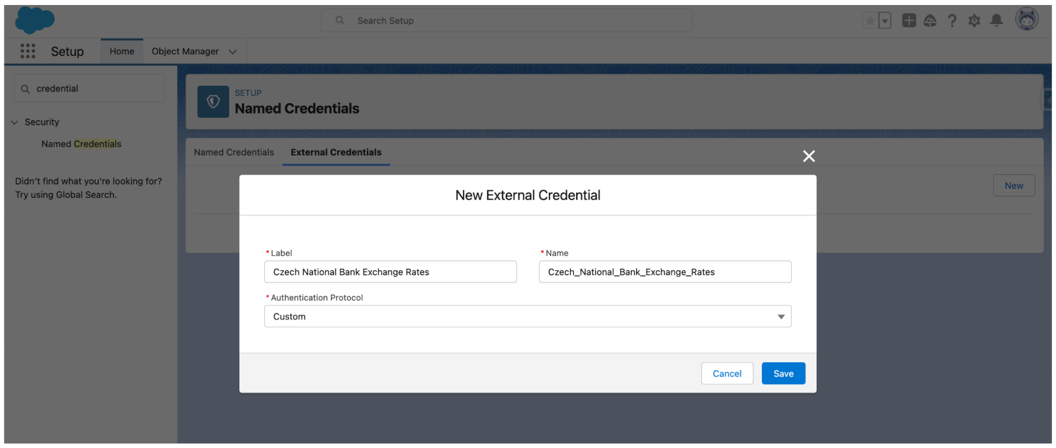
## Setting up Name Credentials and External Credentials

5. From **Setup** navigate to **Named Credentials** using the quick search and open the **External Credentials** tab.



You don't have any external credentials.

6. Click **New** and provide the following information
   a. Label: Czech National Bank Exchange Rates
   b. Name: Czech_National_Bank_Exchange_Rates
   c. Authentication Protocol: select Custom



New External Credential

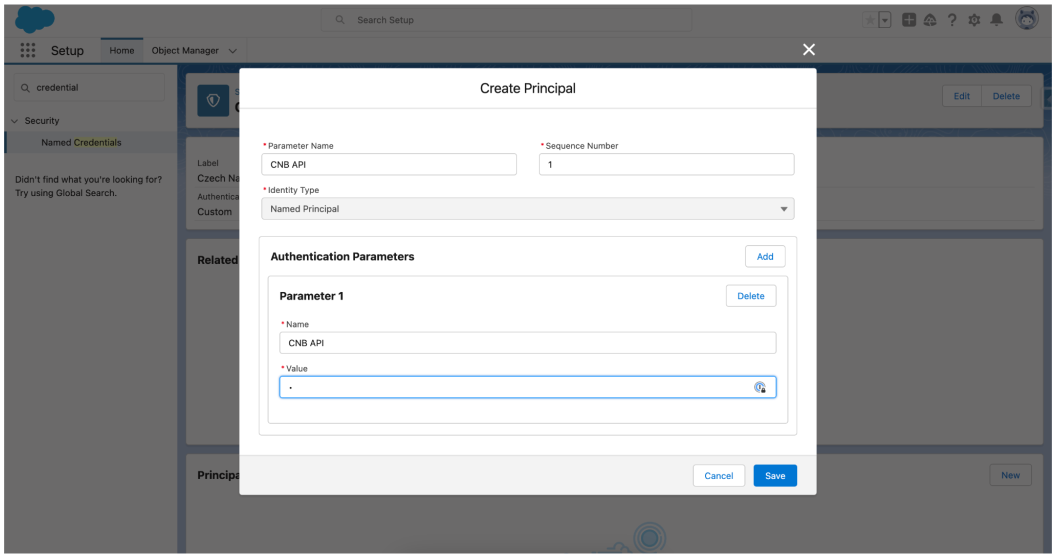
* Label: Czech National Bank Exchange Rates

* Name: Czech_National_Bank_Exchange_Rates

* Authentication Protocol: Custom

7. Click **Save**

8. Click the **New** button to create a new **Principal** for the newly created External Credentials
9. Provide the following information
   a. Parameter Name: CNB API
   b. Sequence Number: 1
   c. Identity Type: Named Credentials
10. Click the **Add** button to add an **Authentication Parameter**
    a. Name: CNB API
    b. Value: 1



Create Principal

* Parameter Name: CNB API
* Sequence Number: 1
* Identity Type: Named Principal

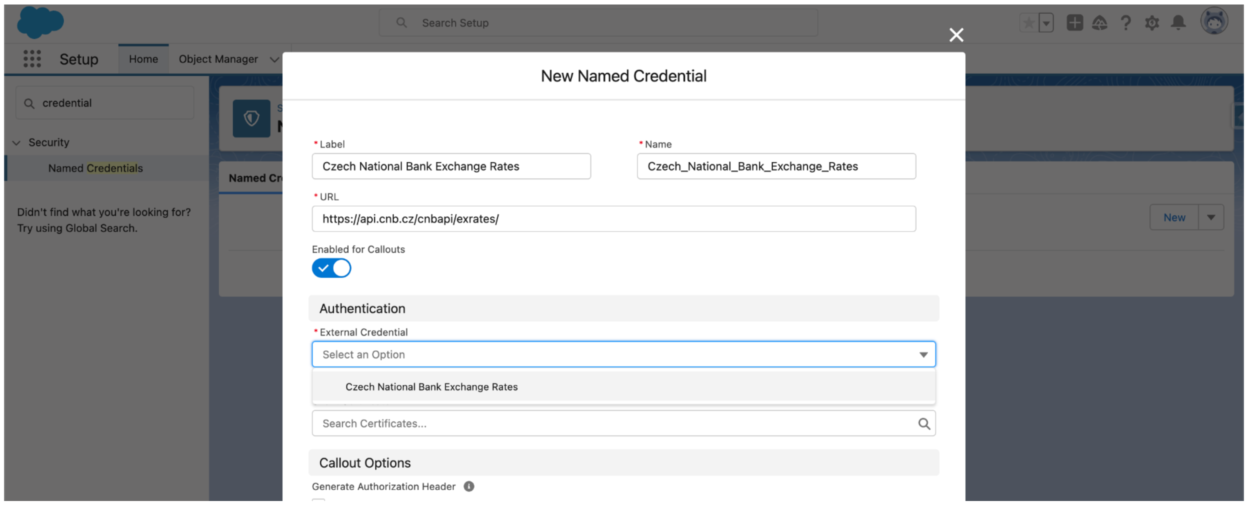
Authentication Parameters

Parameter 1

* Name: CNB API
* Value: .

11. Click **Save**

12. Navigate back to the main **Named Credential** tab
13. Click **New** and provide the following information
    a. Label: Czech National Bank Exchange Rates
    b. Name: Czech_National_Bank_Exchange_Rates
    c. URL: https://api.cnb.cz/cnbapi/exrates/
    d. Enable for Callouts
    e. External Credential: Czech National Bank Exchange Rates



New Named Credential

* Label: Czech National Bank Exchange Rates
* Name: Czech_National_Bank_Exchange_Rates
* URL: https://api.cnb.cz/cnbapi/exrates/

Enabled for Callouts: ✓

Authentication

* External Credential: Select an Option
  Czech National Bank Exchange Rates

Search Certificates...

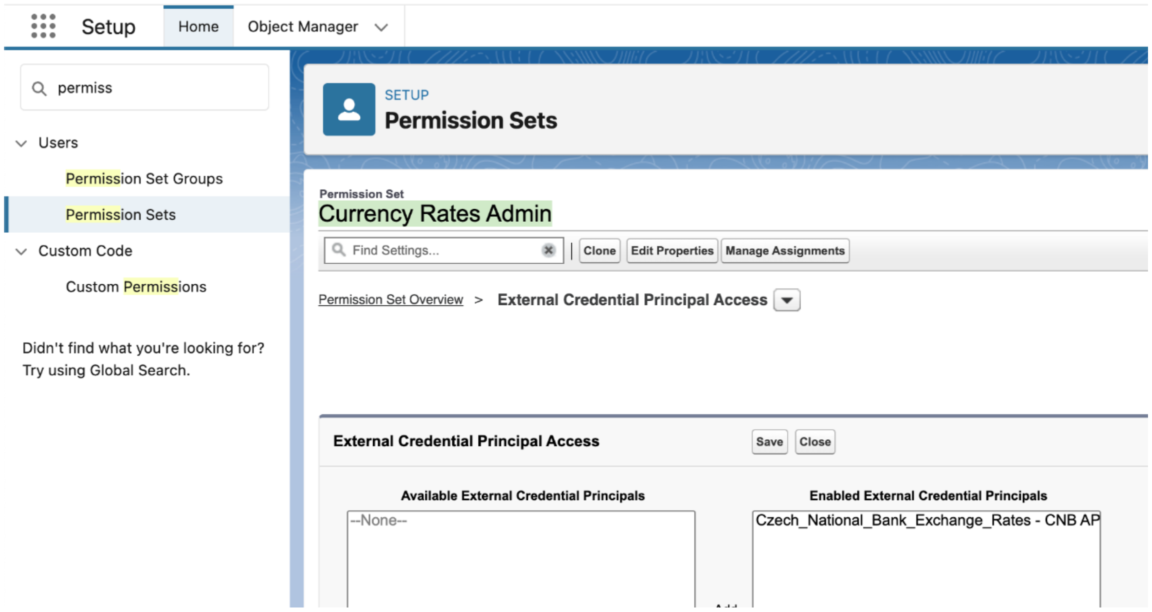
Callout Options

Generate Authorization Header

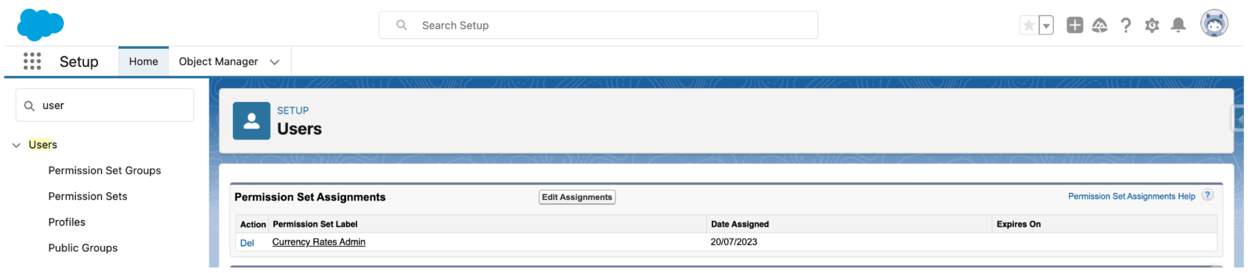
14. Click **Save**

## Update the app Permission Sets

15. Through **Setup** navigate to **Permission Sets** and edit the **Currency Rates Admin** permission set
16. Open the **External Credential Principal Access** and move the newly created principal to the enabled side


Setup
Home
Object Manager
permiss
Users
Permission Set Groups
Permission Sets
Custom Code
Custom Permissions
Didn't find what you're looking for? Try using Global Search.
SETUP
Permission Sets
Permission Set
Currency Rates Admin
Find Settings...
Clone
Edit Properties
Manage Assignments
Permission Set Overview > External Credential Principal Access
External Credential Principal Access
Save
Close
Available External Credential Principals
--None--
Enabled External Credential Principals
Czech_National_Bank_Exchange_Rates - CNB AP

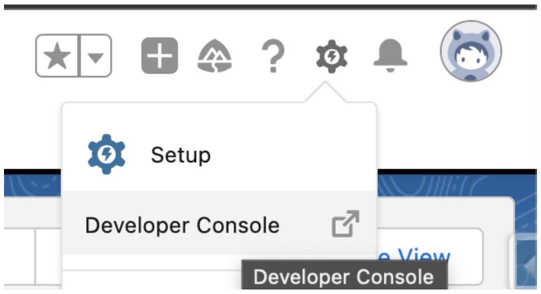
17. Select and open the record of a user with a **System Administrator** profile
    *<u>This user will be the running user of the Apex Job</u>*.
18. Navigate to the **Permission Set Assignment** section and add the **Currency Rates Admin** to the permission set.



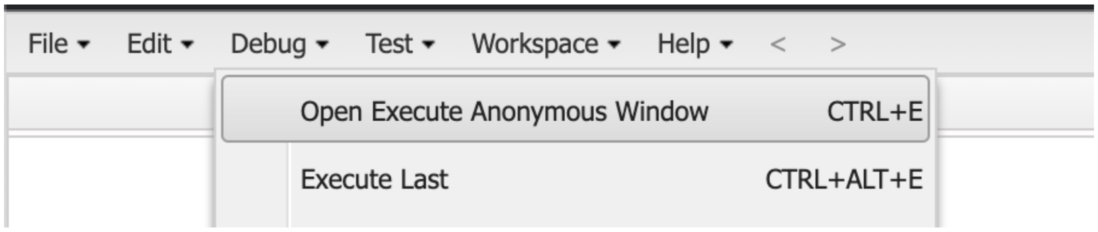
| Action | Permission Set Label | Date Assigned | Expires On |
|---|---|---|---|
| Del | Currency Rates Admin | 20/07/2023 | |

## Schedule the Job

19. Through the setting menu, open **Developer Console**



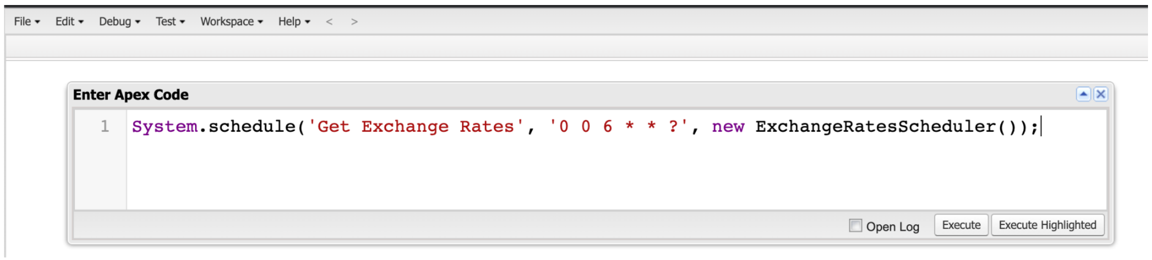
20. Through the **Debug** menu open the **Anonymous Execution** window



21. Enter the below line and click **Execute**

    **System.schedule('Get Exchange Rates', '0 0 6 * * ?', new ExchangeRatesScheduler());**

    The line above will run the job at 6AM on a daily basis. To run the job at a different time, please refer to the [Salesforce Documentations](#) for additional information.

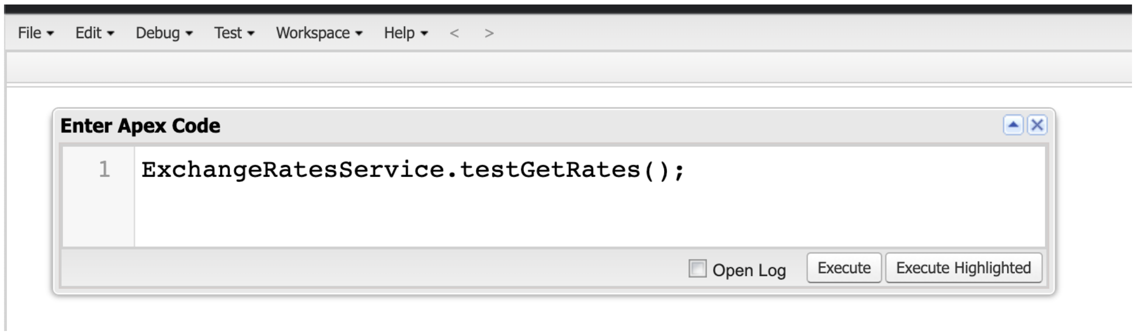


```
System.schedule('Get Exchange Rates', '0 0 6 * * ?', new ExchangeRatesScheduler());
```

22. Reopen the window to enter the below line and click **Execute**

    **ExchangeRatesService.testGetRates();**

    This line will run the logic for the first time and will populate the records from the endpoint, allowing you to verify that the job will execute correctly at the given time.

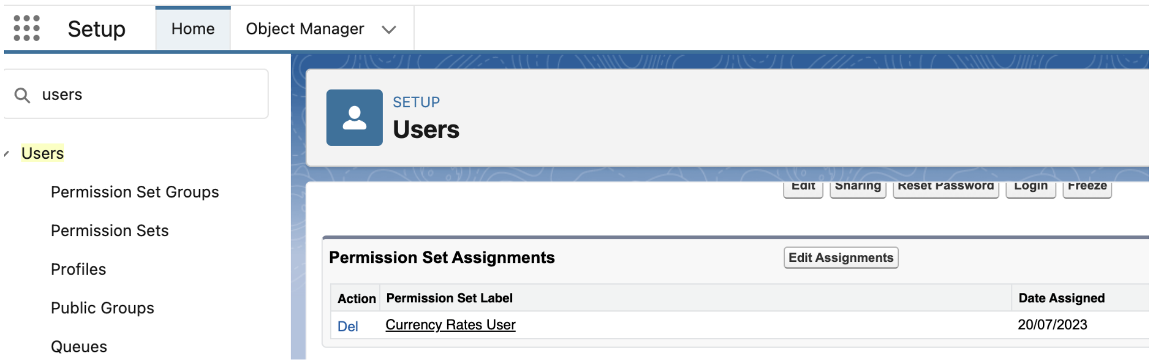


```
ExchangeRatesService.testGetRates();
```

23. **Close** the Developer Console window

## Provide access to Users

24. Add the permission set **Currency Rates User** to users that should have access to the app.

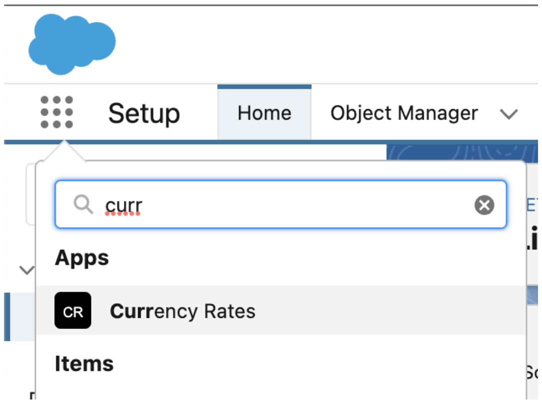


Permission Set Assignments

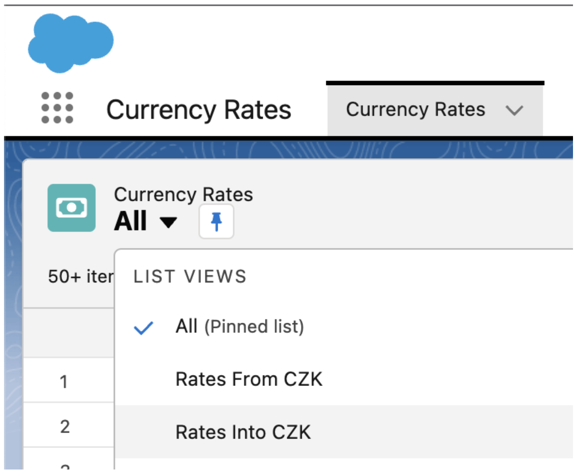
| Action | Permission Set Label | Date Assigned |
|---|---|---|
| Del | Currency Rates User | 20/07/2023 |

## Access the App

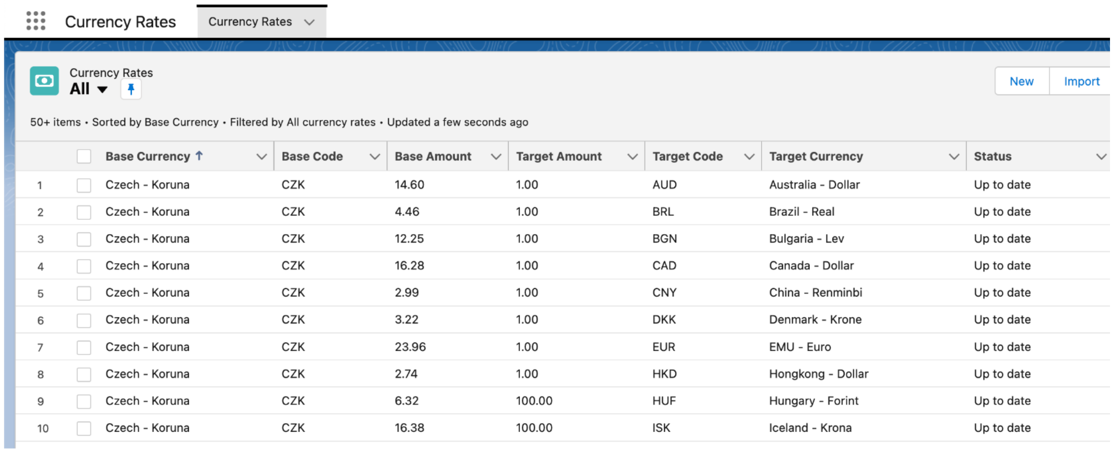
25. Through the App Launcher look for the **Currency Rates** app



26. Select the appropriate list view from the drop-down



27. Observe the rates and their status



50+ items • Sorted by Base Currency • Filtered by All currency rates • Updated a few seconds ago

| | Base Currency ↑ | Base Code | Base Amount | Target Amount | Target Code | Target Currency | Status |
|---|---|---|---|---|---|---|---|
| 1 | Czech - Koruna | CZK | 14.60 | 1.00 | AUD | Australia - Dollar | Up to date |
| 2 | Czech - Koruna | CZK | 4.46 | 1.00 | BRL | Brazil - Real | Up to date |
| 3 | Czech - Koruna | CZK | 12.25 | 1.00 | BGN | Bulgaria - Lev | Up to date |
| 4 | Czech - Koruna | CZK | 16.28 | 1.00 | CAD | Canada - Dollar | Up to date |
| 5 | Czech - Koruna | CZK | 2.99 | 1.00 | CNY | China - Renminbi | Up to date |
| 6 | Czech - Koruna | CZK | 3.22 | 1.00 | DKK | Denmark - Krone | Up to date |
| 7 | Czech - Koruna | CZK | 23.96 | 1.00 | EUR | EMU - Euro | Up to date |
| 8 | Czech - Koruna | CZK | 2.74 | 1.00 | HKD | Hongkong - Dollar | Up to date |
| 9 | Czech - Koruna | CZK | 6.32 | 100.00 | HUF | Hungary - Forint | Up to date |
| 10 | Czech - Koruna | CZK | 16.38 | 100.00 | ISK | Iceland - Krona | Up to date |

TODO : add information about the formula field, and errors for debugging and troubleshooting