

Low-code offers the possibility for ALTO* Investment users to extend and customize the platform. Portfolio managers use this functionality to integrate their customized processes, analysis, simulations, while relying on a solid framework for their portfolio data.

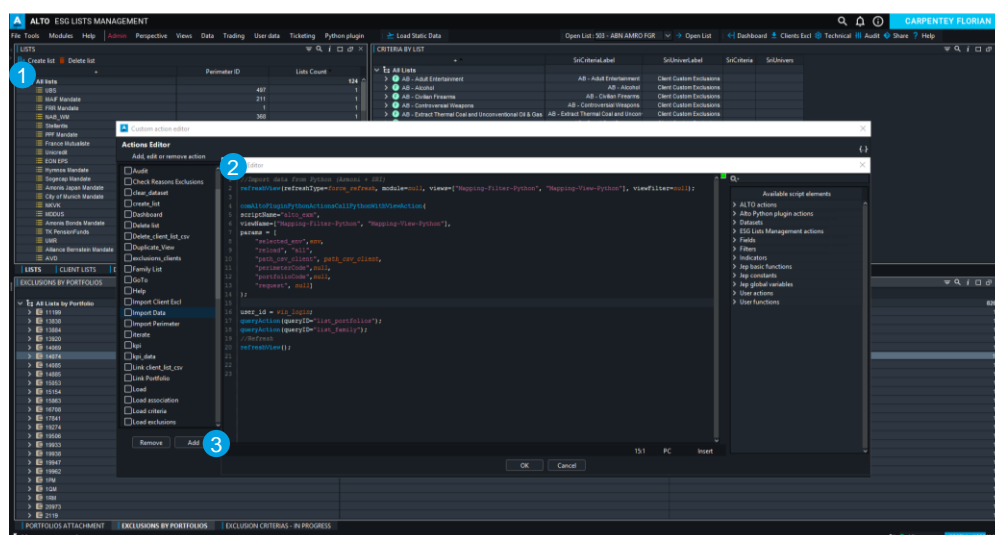
Low-code, a way to customize the ALTO* Investment platform

The purpose of ALTO* Investment is to address the willingness of users to be more autonomous by offering a technological support to carry out potential clients' developments or changes. Amundi Technology is the forerunner in making the platform scriptable by lowering the technical barriers without compromising the platform's security and integrity. This strategy is in line with the objective to offer tailor-made solutions suited to clients' needs:

- Set up a platform allowing users to **write scripts in Python**;
- **Create new features** dedicated to investment strategies;
- **Execute code directly** inside the portfolio management system.

To write scripts, users can access the dedicated solution directly from ALTO* Investment. The development environment, totally configured and secured, creates a skeleton where users can put their lines of code. All the data in ALTO* Investment is consumable by scripts, the execution mechanism is completely transparent, and the result integrates seamlessly into the platform. Standard Python libraries are pre-installed: Numpy, Pandas, QuantLib, Tensorflow, etc. Portfolio managers, risk officers, analysts, and technological experts benefit from the low-code capabilities for automation of **investment process, stock screening, risk simulation, and stress tests**.

The aim is also to bring “non IT users” into this framework without exposing them to the technical complexity. The goal is to create “safe areas” inside the ALTO* platform, where users can code without causing any damage.



- 1 List of portfolios to select
- 2 Script interface with existing libraries and interactive coding
- 3 Integration between Script and Python

Low-code, a real world sand box for ALTO* Investment users

After a successful proof of concept, which offered a restricted group of users the possibility to gain more autonomy, the **low-code functionality is now ready to be deployed to new users**. The solution is continuously enhanced thanks to early users' feedbacks in order to seek a high-level user experience.

```

def greeks(reset_date: datetime, local_index: pd.Series, hedged_index: pd.Series, fx_spot: pd.Series, initial_fx_spot: pd.Series):
    den = hedged_index * fx_spot / \
        (hedged_index.loc[reset_date] * fx_spot.loc[reset_date])
    delta_basket = local_index / local_index.loc[reset_date] / den
    delta_fx = initial_fx_hedge_ratio / den
    return pd.DataFrame({
        'delta_basket': delta_basket,
        'delta_fx': delta_fx
    })

def compute(data: Dict[str, pd.DataFrame], greeks_date, initial_hedge_ratio: float = -1) -> Dict[str, pd.DataFrame]:
    benches = data['benches']
    greeks_date = datetime.fromisoformat(str(greeks_date))

    reset_date = greeks_date + pd.tseries.offsets.MonthEnd(-1)
    start = greeks_date + pd.tseries.offsets.MonthBegin(-2)

    indexes = ['BCITIT Index', 'BCITIE Index', 'EURUSD WMOO Currency']

    data = market_data(start, greeks_date, indexes)
    data = prepare_data(data, reset_date)

    data = pd.concat([
        data,
        greeks(greeks_date, data['local_index'], data['hedged_index'], data['fx_spot'], data['initial_fx_spot'])
    ])
    
```

Python script executed with ALTO* Investment parameters

Low-code, an open world in an industrial framework

Although the solution offers new room for liberty in a restricted area, the security of the platform and of data is essential. Several restrictions have been established by Amundi Technology to prevent any fraudulent action, thus reinforcing and ensuring users data security and confidentiality.

- **Preserve data confidentiality:** data access is allowed exclusively through authenticated APIs.
- **Flexibility of the platform:** each user is isolated from the other users in a single-user virtual area. Furthermore, there is a resource quota per user (CPU, RAM), real-time monitoring. There is a possibility to block APIs calls from a specific user for a given amount of time if the quota is reached.

About Amundi Technology

Amundi Technology offers innovative technology and services to support clients reshaping their operating model. The solutions proposed aim at meeting the needs of all savings and asset management actors: asset managers, asset owners, distributors, wealth managers and asset servicers. The technology platforms provide clients with adaptive solutions enabling them to focus on their core business.

The solution proposed are: ALTO* Investment, ALTO* Wealth & Distribution, ALTO* Employee Savings & Retirement, and specialized solutions.



Please contact us for more information: amundi.technology@amundi.com

**Amundi Leading Technologies & Operations*

This document is intended exclusively for professional clients and/or eligible counterparties, within the meaning of European Directive No. 2004/39 of 21 April 2004 on the markets in financial instruments ("MiFID"). This document is not intended for citizens or residents of the United States of America or to any "U.S. Person", as this term is defined in SEC Regulation S under the U.S. Securities Act of 1933. This document is provided for information purposes only and for the exclusive use of the person who receives it. Under no circumstances does it constitute a purchase offer, investment advice or a solicitation to sell, nor does it form the basis of a contract or commitment of any kind whatsoever. Amundi Asset Management accepts no liability is subject to change without notice. It is deemed whatsoever, whether direct or indirect, that may arise from the use of information contained in this document. Amundi may in no way be held liable for any decision or investment made on the basis of information contained in this document. This information may not be copied, reproduced, modified, translated or distributed without the prior written approval of Amundi AM. This document has not been reviewed by any supervisory authority. The information provided in this document accurate as at 31 December 2021.

Amundi Technology is a service provided by Amundi Asset Management, a French "société par actions simplifiée"- SAS with capital of 1 086 262 605 euros - Portfolio Management Company approved by the AMF under number GP 04000036 - Registered office: 90, boulevard Pasteur - 75015 Paris - France - 437 574 452 RCS Paris.
Design and production: Amundi Technology Marketing Department - 02/2022