

CAPILEVER

SMARTLY **ACTIVATE** YOUR ASSETS

Product Overview

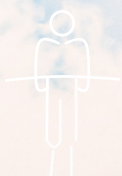
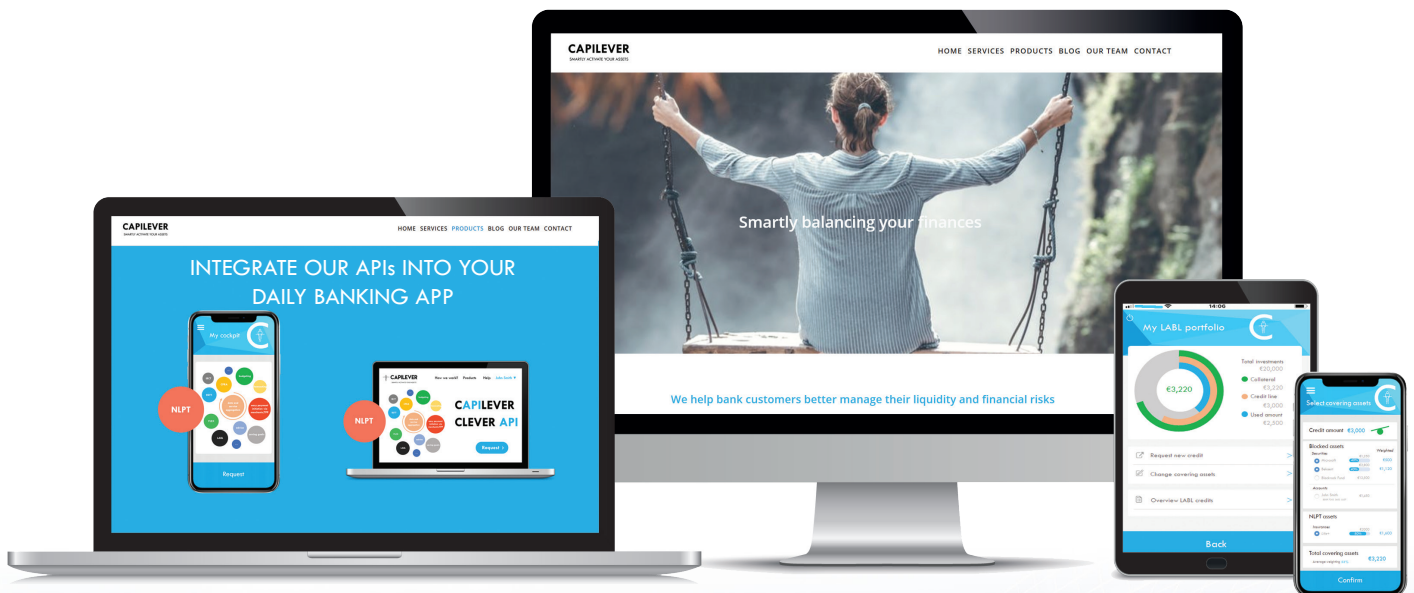


About us

Capilever is a **Belgian Fintech company** founded in 2018, which aims to help financial institutions in the **Credits and Investments domain**. Apart from providing services, Capilever has developed **6 innovative software solutions** for financial institutions to assist their customers in better **managing** their **financial risks**.

Capilever believes that the core strength of a financial institution is its positioning as **gatekeeper of trust** and its expertise in financial risk management. By partnering with a digital native company like Capilever, the bank or insurer can combine these strengths, with the agility and innovative culture (both from a product as from a technological point of view) of a start-up like Capilever.

All products offered by Capilever are **highly automated customer engagement tools**, with a strong focus on investments and credits and offered to the bank or insurer as white-labelled, pre-packaged solutions. Via containerization of the solution and well-documented APIs, the solution can be easily deployed and integrated in the bank's application architecture.



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In the retail and SME space, many customers have a few thousand euros invested in a securities portfolio. Usually these investments are foreseen for the medium- to long-term. At the same time many of these customers experience from time to time **short-term liquidity shortages**. In this situation, these customers will rarely apply for a consumer credit (as it takes too long and results in very high interest rates), but instead postpone their purchases or sell their investments. Both cases are disadvantageous for the bank.

To avoid such liquidity shortages, most banks recommend keeping up to 5 times your monthly salary in a highly liquid saving account, but this has a large opportunity cost for the customer. Wouldn't it be great instead that you can invest all your money in medium- to long-term investments, but be able to generate liquidity via a lower-interest rate credit, which is backed by these investments as collateral? In private banking this product exists, i.e. the **Lombard Credit loan**, but unfortunately this product is managed very manual and is only open to the top segment of the bank.

Capilever's LABL tool offers a way to **democratize this product via extensive automation**. The tool does not only provide a fully automated end-to-end origination process (which allows to receive money in a matter of minutes), but also covers the servicing process afterwards (which covers a continuous monitoring, alerting and automatic actions in case the collateral value is no longer sufficient for the outstanding credit value). Furthermore, the tool provides a much higher flexibility, allowing to switch collateral assets during the lifecycle of the credits.

While the LABL product provides a solution for short-term liquidity needs, a typical household has also strong **fluctuations in their liquidity, due to medium- to long-term changes in their income and expenses**, e.g. due to salary increases or part-time work on the income side and due to mortgage payments or children on the expense side. The FLEX product of Capilever aims to provide an answer to manage these medium to long-term imbalances in the customer's budget.

FLEX is therefore a **long-term contract**, which **combines an investment and credit product**, in 1 flexible and easy to use end product for the customer. The product is opened with a fixed duration and base amount (adapted for inflation during the FLEX contract). Every month the customer can decide between receiving (half/full) the base amount, doing nothing or paying (half/full) the base amount. This limits the choice for the customer between 5 possible actions every month, making budget management much easier for the customer. A clear dashboard shows the number of remaining slots of each action type (a FLEX contract of X months has X/5 slots for each action type), making it very easy for a customer to attribute actions for the future.

For banks to provide proper financial services to their customers, they need a **holistic view** of the wealth of their customers. Unfortunately, a bank only has a view on the money deposited at that bank. Thanks to PSD2 and the rise of account aggregators, banks now have also a view on the cash positions at other banks, but they are still missing all investments and credits held at other financial institutions and all non-financial assets and liabilities (such as real estate, collections, cars...).

The NLPT tool provides a **user-friendly platform for a bank employer or the customer to input these assets and liabilities** and their value. Via alerting and algorithms, the tool tries to keep the data and the valorizations up to date, which is a typical problem for such manually maintained data.

Customers will be hesitant to do this effort (and share their personal data), when they don't see the immediate added value for them. The NLPT tool tries therefore to be a **central cockpit**, which can be easily **integrated with value-added services of the bank**, like investment profiling, customer reporting or robo-advisors. Capilever provides furthermore out-of-the-box integrations with the LABL product (allowing customers to use NLPT positions also as collateral for LABL credits) and CPRA product (allowing the customer to improve his solvability scoring). The more tools make use of the NLPT data, the more the customer will see the added value of inputting the data and keeping it up to date.

Due to the low-interest rates, customers are more and more forced to invest their money in securities. While there are many players offering brokerage platforms for the specialized investor or robo-advisors for customers wanting assistance, there is a gap in the market for an **execution-only brokerage tool, focused on the novice investor**, who is not acquainted with all specialized trading terminology and who wishes to minimize his market risk in a simple and transparent way.

RSTT is such a brokerage tool, allowing the customer to easily find a security of a specific risk profile, sector and/or region. When customer has selected a security, the tool shows the impact on the **portfolio diversification** of adding the security to the customer's portfolio (and suggests other securities with same risk profile, sector and currency, but with a better resulting portfolio diversification). When the customer decides to buy a security, the tool will automatically request the customer to **capitalize profits** (of more than X%), **limit losses** (of more than Y%) and **reduce the timing-risk** by automatically spreading out the acquisition over time. All these risk mitigation techniques are presented to the customer in **a graphical way and in layman's terms**.

While trying to select the right mortgage loan for your house or a term deposit to invest your money in, people often compare different rates between different banks, but **comparing different products** of the same bank, with different durations or **different interest schemes** (e.g. fixed versus variable 3/6/9 or variable 1/1/1) is much less common. A lack of tooling is the main reason for this.

Capilever's IRCT tool aims to provide an answer to this, by allowing to compare credit/investment products with different durations and interest schemes from the bank **in an easy way**. The user just selects a pre-defined (or input a custom) curve of his idea for the future market interest rate and inflation rate and the tool automatically calculates the total (discounted or not) reimbursement amount. This allows a very easy comparison of different products, depending on **different scenarios of how interest and inflation** will evolve in the future.

As a retail or SME customer, you continuously transact with other retail or SME customers. Every transaction of this kind poses an **important counter-party risk** (counterparty might not be able to fulfill his financial obligations towards you or even worse might be fraudulent). Large companies perform complex and costly due diligence processes to quantify and mitigate these risks, but as a retail or SME you don't have the means to do this. Apart from a quick lookup in Google or on social media or in best case a check of references, you don't have much tools available.

Banks with their role of **gatekeeper of trust** have a lot of information about the financial situation and trustworthiness of their customers and can offer a simple, easy to use **due diligence service to their customers**. The CPRA tool of Capilever allows to request access to the risk profile of a customer. When this customer gives content, the user sees a simple score (cfr. energy label) on 3 factors, i.e. **solvability, liquidity and trustworthiness**. This gives a simple tool to customers to do a due diligence, without the need for the counterparty to expose confidential financial data.

LABL

Liquid Asset Based Lending

Liquid Asset Based Loans

Imagine you have a short-term **cash need** [e.g. university fees for your kids] but you do have some long-term securities in your investment portfolio. Instead of selling these assets, wouldn't it be great if your bank allows you to temporarily block these assets and get a cheap short-term loan facility to bridge the gap? At Capilever we believe that **lending responsibly against your investments is an underexploited market opportunity**. If delivered well with the right level of automation and self-service capabilities, it creates great value for both banks and their customers.

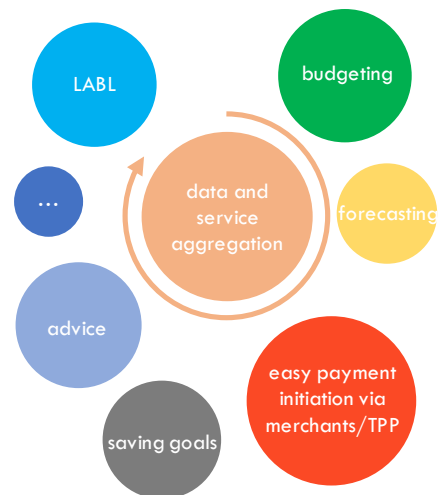
Lending against liquid marketable assets like securities and bonds, has been around for quite some time. Nowadays, we find **liquid asset-based lending (LABL)** or Lombard loans mostly in the private banking segment. High net worth individuals can borrow against some of their assets. In the corporate space this type of lending facility is also frequently available, offering flexible credit lines and working capital for large corporates.

Finally, a great opportunity is available in the **retail and SME banking space**.

At Capilever we strive to enrich the lending and investment offerings of banks in their digital channels. Daily banking apps and PFM/BFM solutions are evolving fast! Banks are gradually adding new services for budgeting, forecasting, advice, etc. Integrating the ability for bank customers to quickly finance their liquidity needs, using their long-term investments, is a perfect extra service to be incorporated in your daily banking offering.

Investments

LABL credit



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Capilever LABL software solution

Capilever's "**Liquid Asset Based Lending**" product (= LABL) provides a **fully automated, end-to-end, white-labelled pre-packaged** solution for liquid asset-based lending. This solution allows bank customers to get a credit by blocking some of their investment products within the banks, like securities, bonds, term deposits, etc. Thanks to an online, user-friendly STP business flow, this credit becomes a self-service offer, allowing to reduce operational costs to a minimum and increase the customer base.

The LABL product provides an end-to-end solution to the origination and servicing of LABL credits:

Origination

- Opening an LABL Framework Agreement, acting as a loan portfolio in which different LABL credits (with same holders as the Framework Agreement) reside
- Requesting a new LABL credit (installment loan or revolving credit)
- Selecting the assets to act as collateral for the loan
- Signing the credit & manage the pay-out

Servicing

- Manage the details of an LABL Framework Agreement (e.g. configure notification outputs, configure which automated actions can be taken...)
- Overview of all loans in the LABL Framework Agreement
- Servicing actions on existing LABL loan, such as early repayment, changing duration, adapting revolving credit line amount, close a credit line or moving a loan to another Framework Agreement (so to other holders)
- Overview of all collateralizable assets, with ability to add/remove collaterals to the collateral portfolio (if collateral value is enough for the outstanding credit amount)
- Alerting of an insufficient collateral value (with proposed actions to correct)
- Alerting of a missed repayment for an installment loan
- Manage succession
- Automatic actions when no manual action taken after alert for an insufficient collateral value or missed repayment for an installment loan

System administration

- Define parameters for origination of LABL credits (e.g. minimum and maximum loan amount, minimum and maximum duration for installment loans...)
- Define parameters for servicing of LABL credits (e.g. number of days between an alert and an automatic action)
- Configure the model to calculate the collateral value of an asset

At the heart of the LABL solution is the algorithm to calculate the **collateral value of the collateral portfolio**. This value is calculated by multiplying the market value of each collateral position, with a collateral weighting percentage (i.e. with weighting = 100% - haircut value).

The market value of a position is standardized, so the differentiation of Capilever's solution comes from an optimal calculation of the haircut value. The haircut value should correspond with the future value-at-risk (for a period equal to the average loan duration and a probability/confidence of X%, typically 99%) of the position.

This value-at-risk is however difficult to calculate (requires lot of data and a complex calculation), very variable in time (i.e. depending on the data in the past on which it is based) and not always very accurate for future predictions. Furthermore, the VaR of a collateral position is not the same as a VaR of the collateral portfolio, as there are correlations in price fluctuations between different positions. Taking these correlations into account would make the model very user unfriendly, as adding / removing a collateral position, would modify the collateral value of other existing collateral positions, which is not desirable.

Instead the LABL software will estimate (via a scoring algorithm) the future value-at-risk of the assets based on asset type (equity, life insurance, saving account, bond, derivative...), asset subtype (e.g. corporate bond, convertible bond, ...), bond rating (S&P, Moody's or Fitch rating), currency, stock exchange (major stock exchange, acceptable stock exchange, emerging market, other), average daily turnover / market capitalization / number of outstanding stocks, and volatility.



Benefits

An LABL credit provides several benefits both to the customer acquiring the credit, as for the bank selling the credit.

Customer benefits

An LABL credit provides several advantages to a customer, compared to traditional consumer credits:

- **A very flexible credit**
 - Choice between revolving credit line & installment credit
 - Flexible choice of amount (incl. fast increase / decrease of credit line)
- **No need to indicate what money will be used for**, i.e. a typical consumer credit will ask where money is used for, unless you ask for a credit without purpose, but interest rates for such a product are extremely high
- **Low & transparent pricing:** as all credits are backed by assets, which are extremely easy to liquidate by the bank, the pricing can be low. Furthermore, as customer needs to provide enough collateral for the loan, there is no need to differentiate the price on amount, purpose of the loan nor on the credit risk of the customer. Only the type of credit and duration of the credit are used for the pricing, giving it a very easy & transparent pricing
- The **existing assets used as collateral can still be actively managed**, i.e.
 - Assets acting as collateral continue to generate income (coupons & dividends) & capital increase
 - Assets can still be sold, if there are enough other assets so that collateral value remains enough.
- **Fully online** credit processing with **immediate availability of cash** (immediate pay-out after confirmation)
- **Pre-approved credits** (i.e. as fully backed by liquid assets)

Bank Benefits

Offering LABL credits provides also several advantages to the bank:

- **Extra credits being sold:**
 - Banks are currently offering asset-based loans only to private banking customers, due to the strong manual tailor-made nature of it
 - Automating this product can reduce time and costs for private banks and help open this product offering to a larger customer segment, thus considerably increasing the volume of credits sold (due to ease of credit and low prices)
 - The target customer segment, holding assets (that don't need to be liquidated in short-term), would normally (rarely) make use of credits, but instead sell off part of their investments or postpone their acquisition
- **Increase customer retention:** while the credit is outstanding, the customer is not only linked to the bank for the credit, but also for the blocked collaterals (investments). Though this may change in the future when Open Banking APIs become available for credits and investments
- Customers can **invest more spare money in more high-margin products**. Currently it is advised to keep up to 3 times your monthly spent in Liquid assets. Via a cheap, highly liquid and easy source of credit, this could be reduced, so that customers can put more money in higher return assets with lower liquidity
- **Reduced risk** for the bank thanks to highly liquid pledging. Credit scoring becomes independent of the individual client rating or due diligence, as mentioned above. With LABL all credits are automatically covered by highly liquid assets, directly taking care of the stricter capital buffer requirements imposed by regulations (Basel II, III)
- **Fully online** processing (i.e. **no manual interventions** required) and perfectly compatible with the innovation agenda of most banks, for example as part of their daily bank app or PFM/BFM solution

| | Car loans | LABL loans | Consumer loans |
|-----------------|---|--------------------------------|--|
| Interest rate | ~1% | ~1.5%-2.5% | > 5% |
| Characteristics | Well-known competitive market | Innovative financing product | Higher interest rate loans |
| Target group | Not impacted by higher interest rate LABL loans → No cannibalization | Targeting new customer segment | Target segment typically does not hold liquid assets → No cannibalization |

Furthermore, the LABL product will not cannibalize the revenues of the existing consumer credits, like installment loans and revolving credit lines (overdraft), as:

- Interest Rate of the LABL product will be higher than the interest rate for a consumer credit on a car
 - Large market share of consumer credits not at risk by the LABL product
 - Other types of consumer credits almost never taken by customers with liquid assets deposited at the bank
- Revolving Credit
 - LABL revolving credit can only be opened, when you have already overdraft on account. This overdraft is used first. The LABL revolving credit can only be used as a credit on top

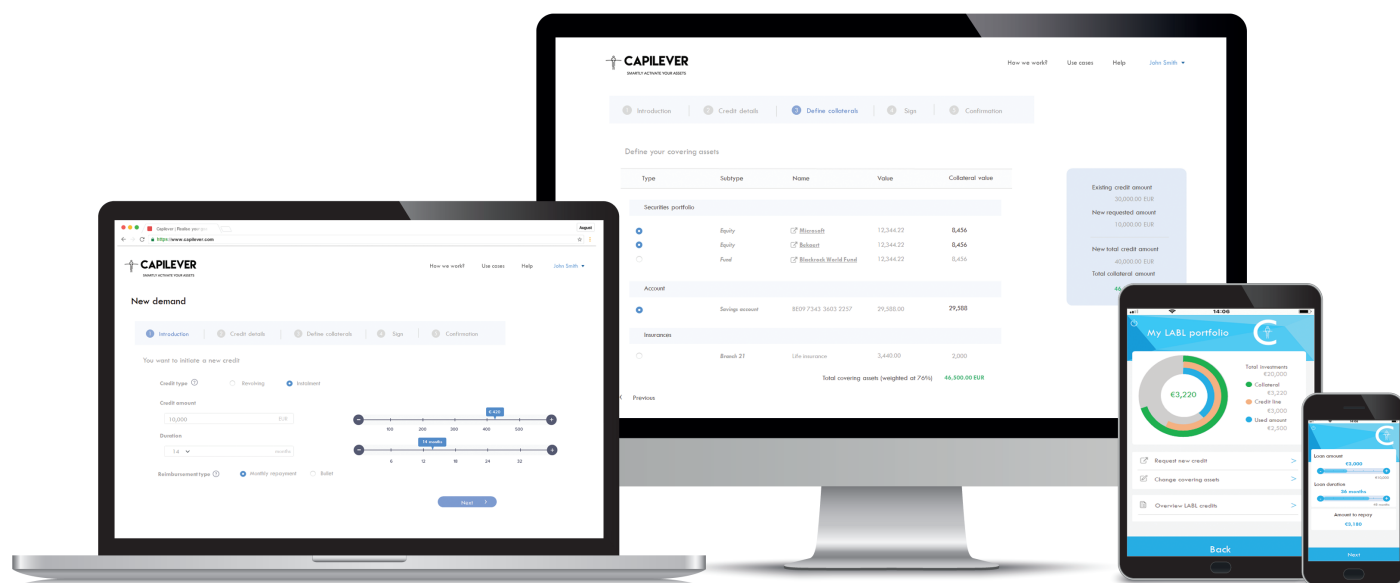
Solution overview

The LABL software package is a **packaged software solution**, which can be **easily configured** via parameters and **customized** via software extensions.

The package is delivered by Capilever, deployed on-premise at the bank (or on a cloud account of the bank) and configured/customized either by Capilever consultants or by the bank itself. Capilever will deliver regular version upgrades, which can be deployed by the bank and for which backwards compatibility of the configurations/customizations is guaranteed. The software solution consists of 4 parts:

Front-end layer

- A white-labelled responsive web front-end, developed in React, which allows to perform all above described functionalities.
- 3 flavors of this web front-end exist:
 - Customer user
 - Bank employee user
 - Administrator
- Basic style-sheet customizations are possible on these screens, but when bank wants to fully integrate and style in the house-style it is recommended to build their own front-end. As front-end is decoupled from application layer, via well-documented REST-based APIs, these can also be used by the new custom-built front-end.





Application layer

- Contains all logic described in this document and provides necessary APIs to the front-end layer to provide necessary application logic
- The layer is built up of several modules:
 - Origination of Framework Agreement
 - Origination of Credit
 - Servicing of Credit
 - Parameterize the application
 - Collateral value (= haircut algorithm) calculation
 - Monitoring & Alerting
 - Automatic actions

Database layer

- A standard SQL database, with a pre-defined, yet customizable data model
- A meta-dictionary allows easy configurability and automatic documentation of the LABL data model.

Integration layer

- The LABL system requires intense integrations with the existing systems of the bank.
- 2 types of APIs:
 - Well-documented REST-based APIs to retrieve info from the LABL platform or make updates to it
 - APIs of the bank called by the LABL system. The application layer is foreseen to call several pre-defined REST-based APIs, which of course will not match with the bank's services. The integration layer will transform those standard LABL APIs to the proprietary APIs of the bank and foresees several mocks (against the pre-defined internal REST-based APIs) in order to setup and test the application without integration with any bank systems.

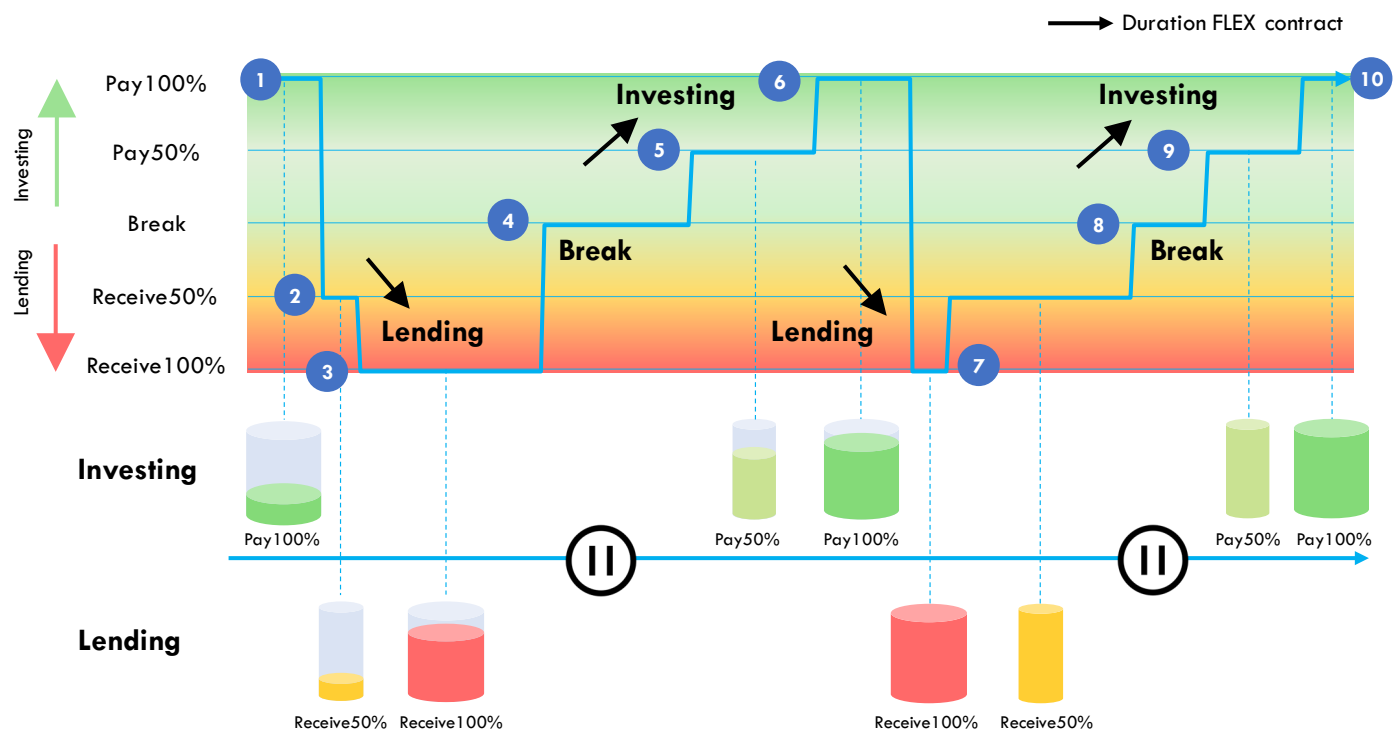
FLEX

Financial Life Event Xeduler

Everybody knows the quote: “*When you’re young you have time and energy but no money. When you get older you have money and energy but no time. And later when you finally have time and money, you no longer have energy*”. In the philosophy of Capilever that banks should help their customers manage their financials and financial risk, we believe banks are ideally positioned to improve this situation.

As target value or benchmark for the FLEX amount, it is advised that the individual customer or household takes between 10% to 25% of their monthly income. This will be illustrated in more details in some of the examples later in this document.

FLEX principle



Life events [example]

1. Start of FLEX contract, client decides to invest first in this example
2. Birth of 1st child with new costs (day-care, etc.)
3. Birth of 2nd child + Dad decides to work 80%
4. Mum made a promotion, however it's still financially challenging so they take a "break"
5. Kids go to school, no more day-care costs
6. Dad starts working full-time again
7. Kids go to college
8. Kids have graduated and leave the house
9. Mortgage is paid back, more breathing room for paying back
10. FLEX contract is closed, in this case client repays outstanding capital during the last slots

During the lifecycle of the contract, the customer can decide between **5 action types**:

- Pay 100%: Full payment of the (compensated) base amount
- Pay 50%: Partial (= half) payment of the (compensated) base amount
- Receive 100%: Full receipt of the (compensated) base amount
- Receive 50%: Partial (= half) receipt of the (compensated) base amount
- Do nothing

During financially difficult periods the customer can choose for a Receive 100%/50% of the FLEX amount, while in better periods the customer can choose for a Pay 100%/50% of the FLEX amount.

The amounts paid/received on a monthly basis are monitored and adjusted in such a way that at the end of the contract there will be zero balance, i.e. the customer does not need to pay / does not receive a remaining amount.

The customer also has the option to prematurely end the contract. In that case the value of the contract at that moment will be either received (if positive balance) or needs to be paid (if negative balance), with a penalty for the early termination of the contract.

Example of FLEX contract

In order to understand the behavior of a FLEX contract, it is best to explain it based on a concrete example.

Suppose a FLEX contract for 30 years (= 360 months) with a FLEX base amount of € 500.

This gives the following number of slots of each action type:

- Customer pays full amount (Pay100%) = Integer division of number of months by 5 = 72
- Customer pays half amount (Pay50%) = Integer division of number of months by 5 = 72
- Custom receives full amount (Receive100%) = Integer division of number of months by 5 = 72
- Customer receives half amount (Receive50%) = Integer division of number of months by 5 = 72
- Do nothing = Integer division of number of months by 5 + Remainder of integer division of number of months by 5 = 72 + 0 = 72

We consider here following parameters for the calculation:

- Debit interest rate (interest rate charged by the bank when FLEX contract has negative position) = 3,60%
- Credit interest rate (interest rate paid by the bank when FLEX contract has positive position) = 1,25%
- Inflation rate = 1,80%

To show the behavior of the contract, we consider 3 scenarios, i.e. 2 extreme scenarios and 1 standard scenario:

- **Extreme scenario 1:** Customer invests first everything and then is paid out
- **Extreme scenario 2:** Customer receives first everything and then pays back
- **Standard scenario:** A typical scenario where choice of action type matches the life situation of the customer

Compensation for indexation and accrued interests

The FLEX contract calculates on a monthly basis the compensated amount the customer receives or has to pay. This is the amount as requested by the customer (Pay/Receive 100%/50% or Do nothing), compensated for inflation and accumulated interests on the FLEX contract position. The compensation aims to adjust the amount for inflation (so that the buying power remains the same over the life-cycle of the contract), but also to ensure that at the end date of the contract the position is equal to €0, without the customer having to receive/pay large amounts at the end of the contract.

Note that this compensation is also capped as follows (using configurable settings):

- When customer must pay money (action type = Pay100% or Pay50%):
 - Maximum 35% increase compared to inflation compensated base amount (the negative scenario of increasing the customer's payment should be capped to protect the customer for having to pay too large amounts)
 - Maximum 75% decrease compared to inflation compensated base amount (the positive scenario of decreasing the customer's payment should be capped to ensure that in a later stage the customer will not have to pay too much or receive too little)
- When customer receives money (action type = Receive100% or Receive50%):
 - Maximum 75% decrease compared to inflation compensated base amount (the negative scenario of decreasing the customer's received amount should be capped, as customer will be counting on this money for his expenses)
 - Maximum 150% increase compared to inflation compensated base amount (the positive scenario of increasing the customer's received amount should be capped to ensure that in a later stage the customer will not have to pay too much or receive too little)
- When customer does not switch action type, there is a maximum deviation of 15% compared to the amount of last month

This gives following results:

- **Extreme 1 scenario:** customer gains € 17.666 of credit interests
- **Extreme 2 scenario:** customer pays € 54.679 of debit interests
- **Standard scenario:** customer (net) pays € 14.341 of debit interests

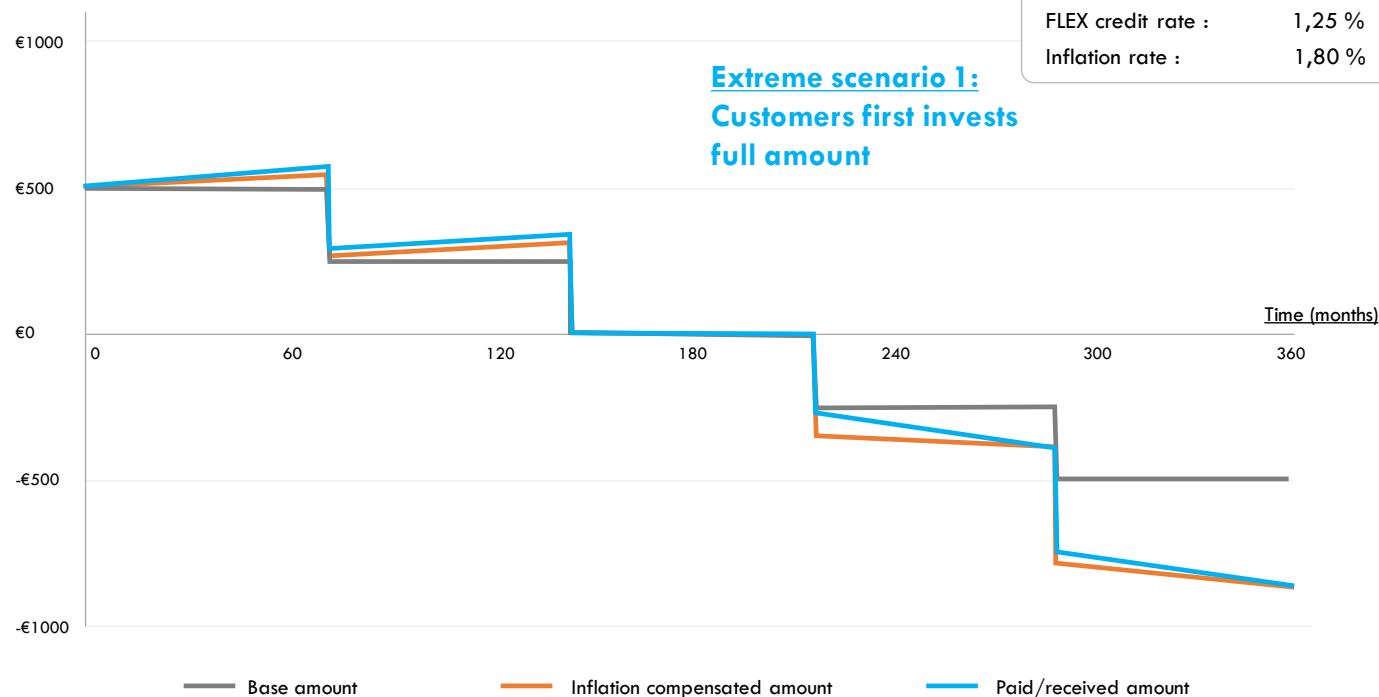
This shows that the interest amount paid by the user, depends on the allocation (timing) of the different action types, the bank's debit and credit interest rates, the FLEX base amount and the contract duration.

Below graphs show the evolution of payments for the 3 scenarios. Each graph shows 3 lines:

- **Base amount** (grey line): the base amount (€ 500) requested as per the action type
- **Inflation compensated amount** (orange line): the base amount line compensated for inflation
- **Amount** (blue line): the actual amount paid/received by the customer, compensated for both inflation and interests

FLEX cash flow schedule – Extreme 1

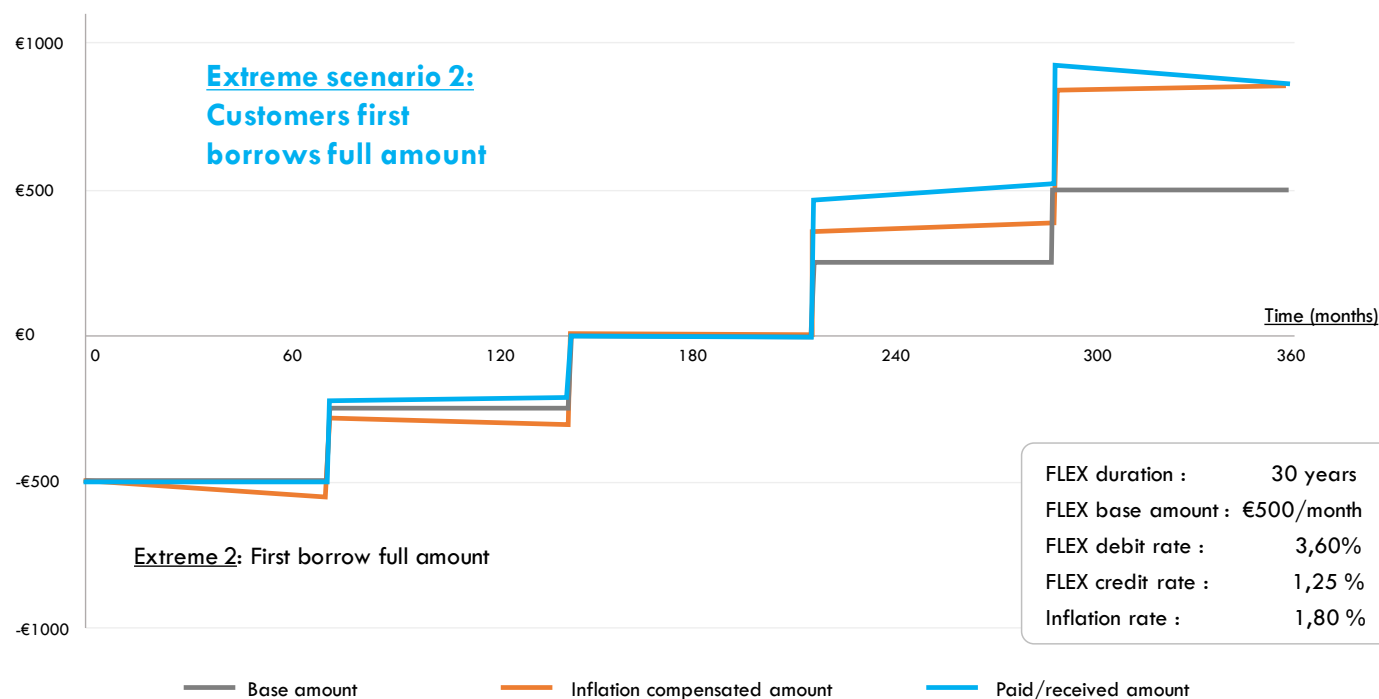
Paid (+) / borrowed (-) amount



FLEX duration : 30 years
FLEX base amount : €500/month
FLEX debit rate : 3,60%
FLEX credit rate : 1,25 %
Inflation rate : 1,80 %

FLEX cash flow schedule – Extreme 2

Paid (+) / borrowed (-) amount

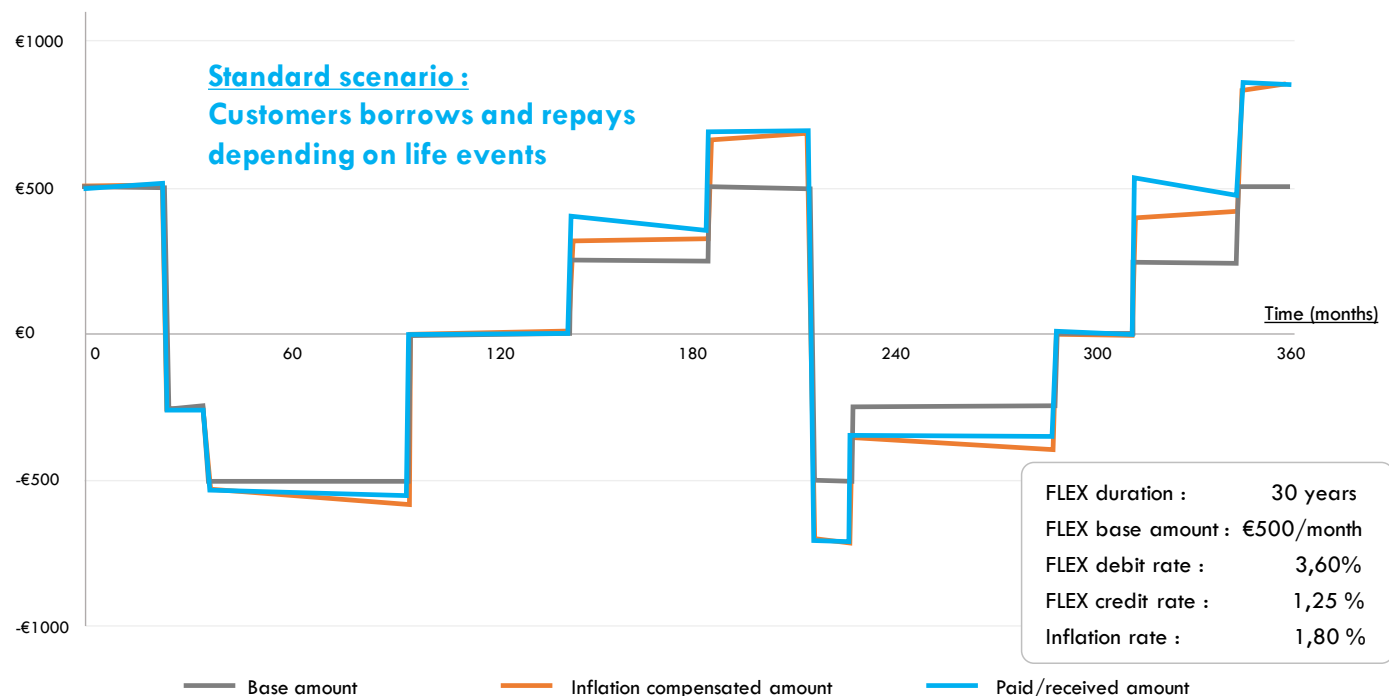


FLEX duration : 30 years
FLEX base amount : €500/month
FLEX debit rate : 3,60%
FLEX credit rate : 1,25 %
Inflation rate : 1,80 %

Extreme 2: First borrow full amount

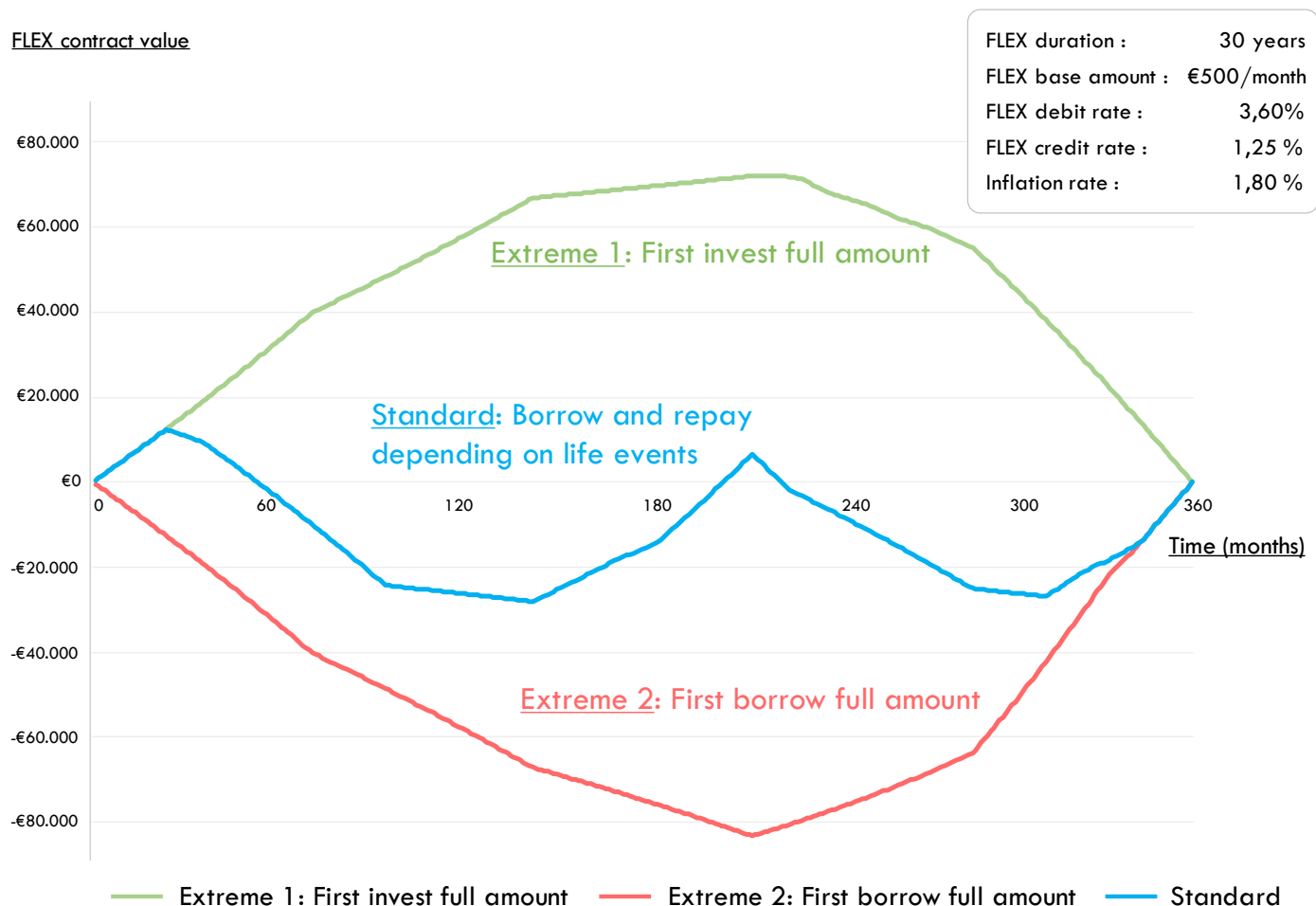
FLEX cash flow schedule – Standard

Paid (+) / borrowed (-) amount



The graph below shows the current position or net value of the FLEX contract during its lifetime. This is calculated by the net sum of all “Pay” and “Receive” flows, with a monthly interest rate amount added to the net position at that moment. More details of this calculation are given further down in this document when explaining the FLEX calculation engine.

FLEX contract value

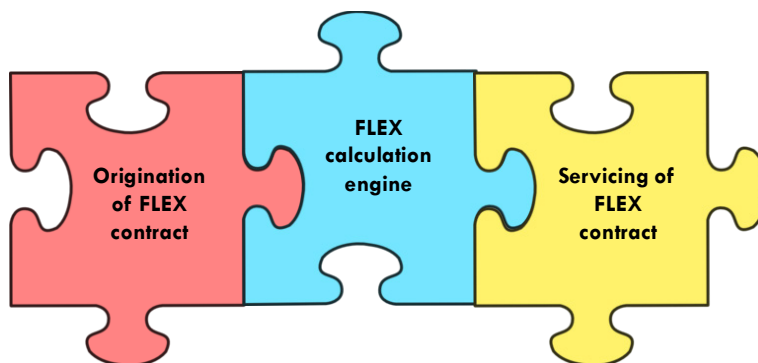


Capilever FLEX software solution

Capilever's FLEX software solution provides a **fully automated, end-to-end, white-labelled pre-packaged** solution to setup the above described FLEX product within a bank.

The tool consists of **3 modules**:

- **Origination** of a new FLEX contract
- **Calculation engine** to calculate several FLEX amounts for the management of the contract
- **Servicing** an existing FLEX contract



Origination of a new FLEX contract



Customer opens FLEX contract with specific duration and FLEX amount



Credit scoring is performed



Customer simulates different FLEX plans



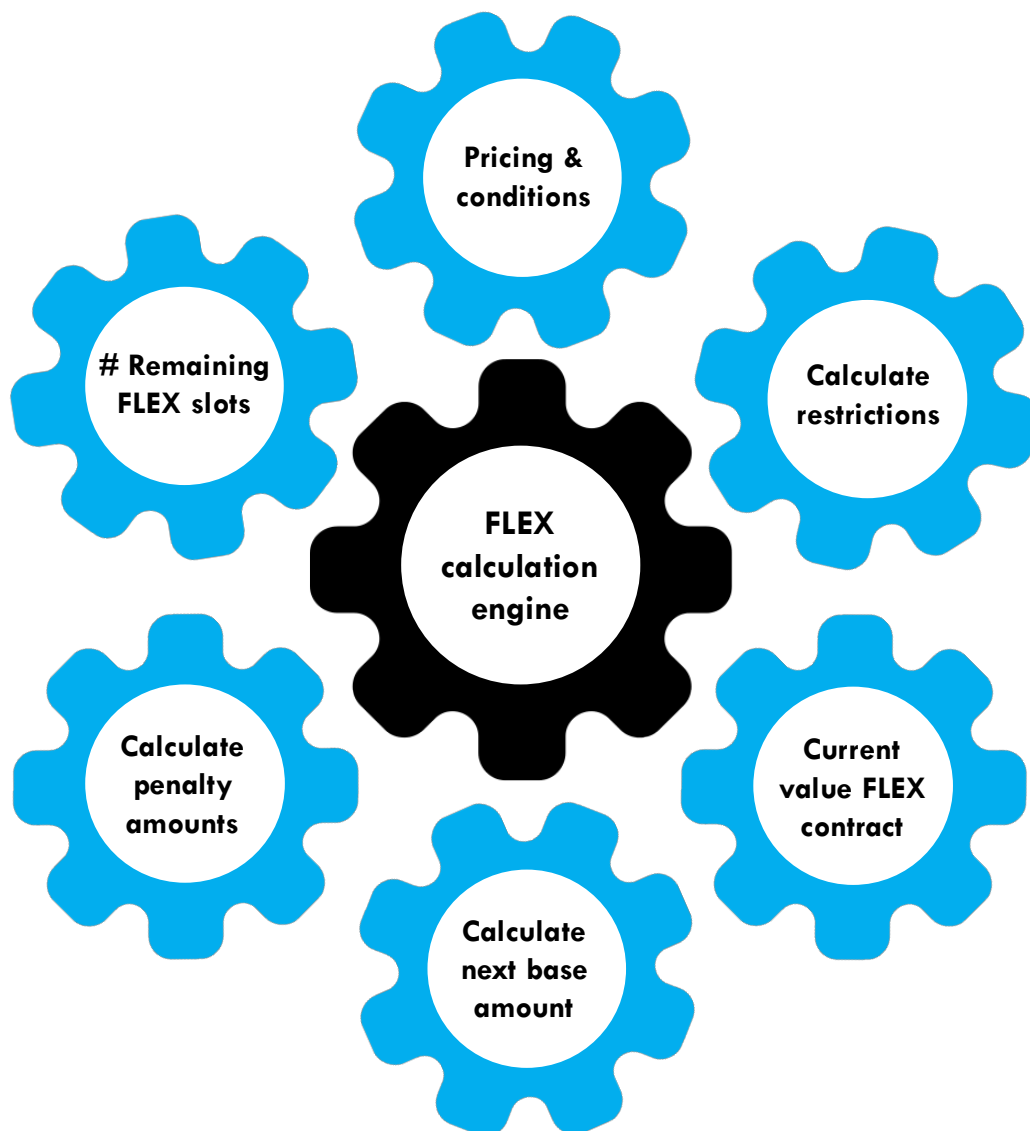
Customer selects plan and signs the FLEX contract

The origination of a new FLEX contract consists of a few steps:

- **Step 1:** Customer opens a FLEX contract, which is defined by:
 - Duration
 - Base amount
 - Owners of the contract (only one borrower/investor or also co-borrower/co-investor)
 - Decide whether base amount needs to be compensated for inflation or not (default is to be compensated for inflation)
 - Bank can configure minima and maxima for duration & base amount. By default, the application has following default values:
 - Minimum duration = 10 year
 - Maximum duration = 35 years
 - Minimum base amount = 100 EUR
 - Maximum base amount = 1.000 EUR
- **Step 2:** A credit scoring is performed. For the credit scoring the application uses the existing scoring system of the bank. As parameters, we assume scoring of a consumer credit with following parameters:
 - Loan duration: FLEX contract duration, divided by 5
 - In above example: 6 years = 72 months
 - Loan amount:
 - $X = \text{total number of slots for action type} = \text{"Receive100\%"}$
 - $\text{Loan amount} = \text{Base amount} \times 85\% \times X \times 1,5$
 - o In above example: $\text{€ } 500 \times 0,85 \times 72 \times 1,5 = \text{€ } 45.900$
 - o The factor 1,5 is required to also consider the actions of type = "Receive 50%" (always equal to number of "Receive100%" action types)
 - o The factor 85% is a configurable parameter. The bank can increase or decrease this factor depending on the risk aversity of the bank
 - o Note that not the full exposure is considered (otherwise inflation increase of the received amount should also be considered). The bank can decide to compensate for this by increasing the configurable weight (currently set to 85%) to more than 100%

- Step 3: The FLEX tool simulates different FLEX plans, i.e.
 - FLEX tool shows the credit and debit interest rate, which are used for the simulation
 - Note that the credit and debit interest rates are determined by a pricing engine, considering the credit scoring of the customer and the conditions of the FLEX contract
 - User can input an average inflation rate. The system uses a default inflation rate, but user can adapt for the simulation
 - Note that during the FLEX contract, the actual inflation rate will be used
 - User can select a pre-defined scenario for the simulation:
 - Default scenario (typical course of life)
 - Extreme scenario 1 – within restrictions (saving first then receiving)
 - Extreme scenario 2 – within restrictions (receiving first then paying back)
 - User can also simulate a specific scenario, by filling in the different action types spread over the duration of the contract
 - User can return to step 1 to adapt certain characteristics of the contract
- Step 4: Acceptance of the conditions and signing of the contract
 - Customer accepts conditions of the FLEX contract
 - Customer inputs the account number from which money will be debited / to which money will be credited (automatic creation of direct debit instruction)
 - Customer digitally signs the opening of the FLEX contract

Calculation engine



The calculation engine calculates several parameters:

- Number of slots (i.e. months) for the 5 action types:
 - Pay100% = FLOOR (Duration in months / 5)
 - Pay50% = FLOOR (Duration in months / 5)
 - Do nothing = FLOOR (Duration in months / 5) + MOD (Duration / 5)
 - Receive100% = FLOOR (Duration in months / 5)
 - Receive50% = FLOOR (Duration in months / 5)
- Pricing engine for determining debit and credit interest rates
 - Rate determined based on current interest rate, scoring of customer and contract details (duration & amount)
- Calculation of restrictions:
 - At the start of the FLEX contract, and based on the credit scoring, a few restrictions can be added, i.e.
 - Calculate a maximum negative position authorized for the customer (resulting from too many money requests in a row, which are not preceded by sufficient money payments). If this maximum is reached, next action will automatically be adjusted to "Do nothing" or to "Pay100%" or "Pay50%"
 - Calculate maximum number of consecutive money requests
 - Calculate maximum ratio/delta between "Pay" action types and "Receive" action types. For example, the bank can configure that the customer may never have 2 times more "Receive" actions than "Pay" actions, from the moment that more than x% of the "Receive" actions have been used
 - Maximum consecutive number of "Receive" action types
 - Minimum number of "Pay" action types during first X months
 - Maximum FLEX contract duration
 - Maximum FLEX base amount
 - When a payment is missed during the contract, automatically all "Receive" action types are blocked until missed payment is resolved
- Calculation of value of the FLEX contract
 - This algorithm calculates on request the value of the FLEX contract. This is calculated by the net sum of all "Pay" and "Receive" flows, with a monthly interest amount added to the net position at the end of the month
- Calculation of next base amount: the algorithm calculates on a monthly basis the amount to be paid/received depending on the selected action type. This is done in following steps:
 - Step 1: Determine base amount based on action type, i.e.
 - Receive100%: (+1) x Base amount
 - Receive50%: (0,5) x Base amount
 - Do nothing: 0 EUR
 - Pay100%: (-1) x Base amount
 - Pay50%: (-0,5) x Base amount
 - Step 2: Adjust base amount for inflation
 - Step 3: Compensate for accumulated interests / inflation, aiming to bring final FLEX contract position to 0 (in a gradual way). This compensation is calculated based on:
 - Difference between actual value of the FLEX contract and value based on FLEX base amounts (without compensation for inflation and interest)
 - Ability of remaining action types to compensate for inflation
 - Step 4: Capping of compensation using configurable cap values. The caps avoid that amounts would deviate too strongly from the action type that the customer is requesting
 - Step 5: Second capping of compensation, by checking the difference compared to previous amount paid / received (only when previous action type was the same action type). This capping prevents too large fluctuations between different months
 - Step 6: Calculate amount by adding capped (with 2 capping rules) compensation amount to the base amount adjusted for inflation
- Calculation of penalty in case of early termination
 - When customer wants to early terminate the FLEX contract, he will receive/pay (respectively when value is positive or negative) the outstanding value of the FLEX contract, decreased/increased with a penalty
 - The penalty is equal to the interest of 3 months (debit or credit) on the outstanding FLEX contract amount. The number of months as penalty is configurable in the application. For example:
 - FLEX contract has value of € -20.000 and debit interest rate = 2,80%. In this case the penalty = € 140, so customer will have to pay €20.140 to close the contract
 - FLEX contract has value of € 20.000 and credit interest rate = 1,20%. In this case the penalty = € 60, so customer will receive € 19.940 when closing the contract

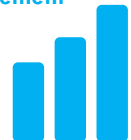
Define next action type

Once a FLEX contract is opened, the contract needs to be serviced. The main action for a contract is defining the next action type. This is handled by a specific screen, in which:

- Customer can adapt which action type (Pay100%/50%, do nothing or Receive100%/50%) they want. Customer has 2 options:
 - Input the specific action type for the upcoming month or even for the rest of the contract duration
 - Set a specific action type, which will automatically be repeated each month, until customer changes
- The FLEX tool shows:
 - How many slots of each action type remain
 - If there are any action restrictions, then this specific action type will be blocked
 - How many receival action types remain until a restriction will be activated
 - For the next month, the calculated amount (based on selected action type)
- Customer can always request a simulation of the FLEX contract for the remaining period
 - System suggests a default filling (with action types) for remaining contract duration, but user can adapt the filling to get a custom simulation for his (predicted) situation
- Customer is alerted:
 - If he has not defined an action for the upcoming month. If no action is defined in time, an action will automatically be selected based on following priority rules (only use next priority, if no remaining slots available of higher priority):
 - Prio 1: Do nothing
 - Prio 2: Receive50%
 - Prio 3: Receive100%
 - Prio 4: Pay50%
 - Prio 5: Pay100%
 - If customer has set an action type to repeat, but restriction is activated or there are no slots left for this action type. If user does not define another action type in time, an action will automatically be selected based on following priority rules (only use next priority, if no remaining slots available of higher priority):
 - If current action type = Receive100%/50%:
 - o Prio 1: Other type of receive
 - o Prio 2: Do nothing
 - o Prio 3: Pay50%
 - o Prio 4: Pay100%
 - If current action type = Do Nothing:
 - o Prio 1: Receive50%
 - o Prio 2: Receive100%
 - o Prio 3: Pay50%
 - o Prio 4: Pay100%
 - If current action type = Pay100%/50%:
 - o Prio 1: Other type of pay
 - o Prio 2: Do nothing
 - o Prio 3: Receive50%
 - o Prio 4: Receive100%

Servicing of the FLEX contract

- ✓ Define next action type
- ✓ Early closure of FLEX contract
- ✓ Change feeding account
- ✓ Change contract holders
- ✓ Adapt FLEX duration
- ✓ Incident management



Early closure of FLEX contract

- Customer can request to close the FLEX contract before the contractual end date. At that moment customer will pay/receive the outstanding position of the FLEX contract, with a penalty (see above “Calculation Engine”)
- Note that this mechanism is also used in case of succession, except that at that moment there is no penalty involved. Before succession is finalized, the contract is blocked, meaning that there are no actions executed anymore

Change feeding account & change involved parties

The user can:

- Select another feeding account for the automatic debiting and crediting of the requested FLEX actions. The user can select any current account with same holder composition as the FLEX contract.
- Adapt the composition of involved parties linked to the FLEX contract. This can happen in case of wedding, divorce or other personal reason. When the composition is changed, a new scoring is executed. There are a few scenarios:
 - Scoring has improved compared to before: this can mean that any applicable restrictions on the contract can be removed
 - Similar scoring: no change to the contract
 - Scoring has worsened: depending on the degree this can result in:
 - No change to the contract
 - (Additional) restrictions added to the FLEX contract
 - Forced early closure of the contract

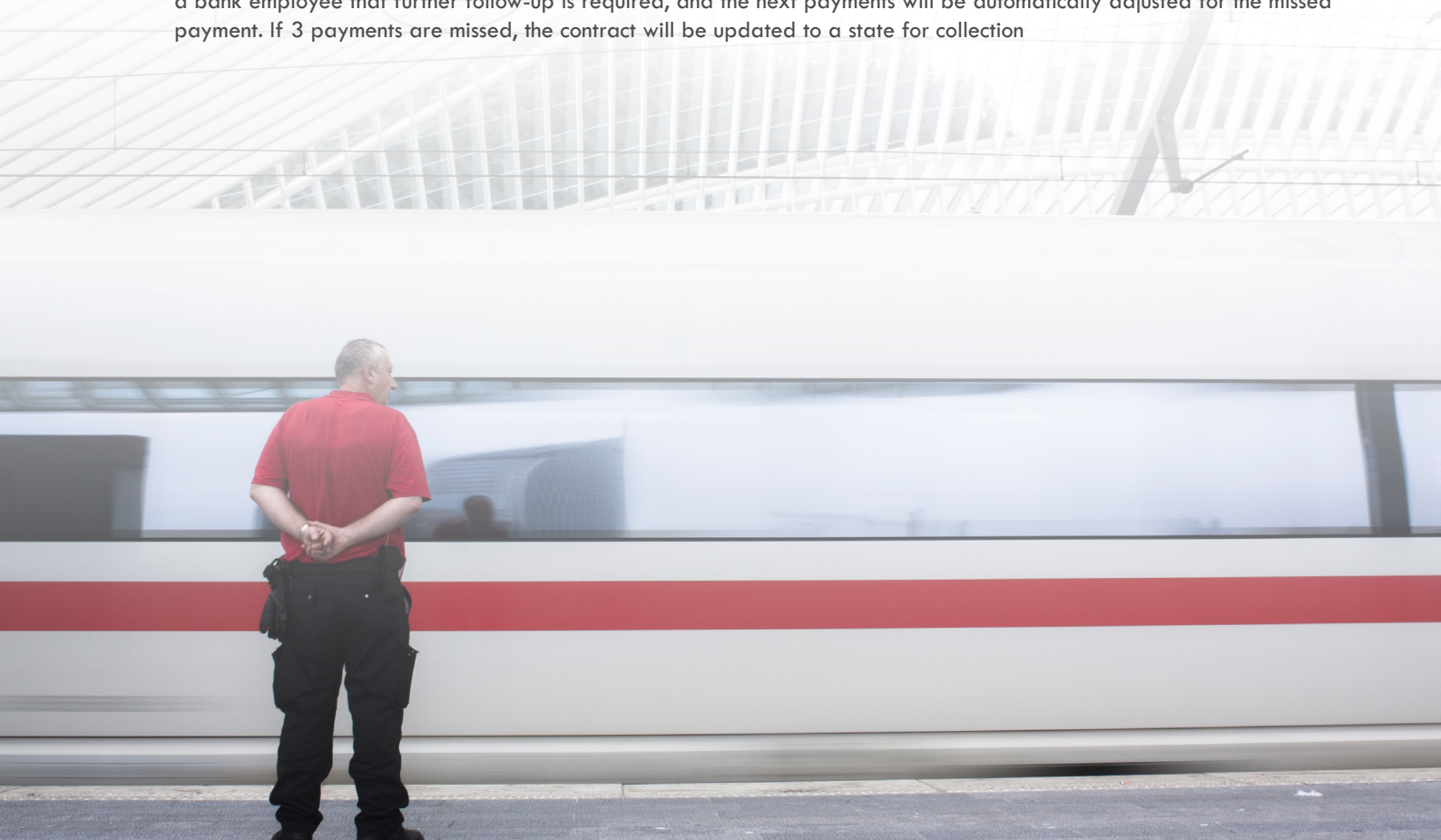
In all scenarios, it will also be required to adapt the feeding account for the FLEX contract.

Adapt duration of the FLEX contract

- User can change the duration of the FLEX contract (within the minimum and maximum boundaries set by the bank):
 - When user decreases duration, system will select the action type for which most slots are used. The minimum duration should be the number of consumed slots of this action type, multiplied by 5. Suppose for example that customer has consumed already 32 "Receive100%", 22 "Receive50%", 17 "Do nothings" and 15 "Pay50%". At that moment user can reduce duration up to $32 \times 5 = 160$ months (i.e. approximately 13 years)
 - When user increases the duration, system equally increases the number of available slots of each action type
- If user wants to (i) modify the base amount or (ii) reduce the contract duration below 5 times the most used action type (and hence not enough time for compensating with other FLEX slot types), then he is forced to early close the contract

Incident management

- When a payment (i.e. execution of a Pay100% or Pay50% action type) could not be executed, due the feeding account not having enough cash, an alert to the customer will be generated
- System will however automatically consider it as an action type = "Do nothing". If there are no slots left for "Do nothing", system will execute a Receive50% or Receive100%, if any slots are left for these action types. Furthermore, system will block Pay100%/50% as future action, until at least 1 successful payment has been done
- If a payment is missed and there are no slots left for "Do nothing", "Receive50%" or "Receive100%" the system will inform a bank employee that further follow-up is required, and the next payments will be automatically adjusted for the missed payment. If 3 payments are missed, the contract will be updated to a state for collection





Benefits

The FLEX product of Capilever provides a flexible, yet structured way, for customers to balance their finances.

Customer benefits

- Customer can **balance** his income/expenses in a **very flexible way over a long period**
- **Improving financial literacy:** instead of customer having to think in term of financial products (investment and credit products), the bank is offering a service combining both, which puts the needs of the customer first. This allows customer, who are not that acquainted with financial products, to have a product tailor-made to their needs (customer centricity)
- Forces customer to **think long-term:** by showing in an easy way, the number of remaining slots for each action type, the customer gets a very simple and clear view on his future finances. The plan of allocating the action types each month, gives a sort of **financial framework** for the customer, which is easy to understand yet flexible, but not too flexible so that the customer's debt rate is not dramatically increased

Bank Benefits

- Extra revenues linked to the new product (debit interest rate significantly higher than credit interest rate)
- Strong customer retention, due to the long-term nature of the contract

Product Differentiation

The product combines a credit and investment product in 1 product, which makes it unique in its kind.

The credit part of the FLEX contract can be situated somewhere between an overdraft (revolving credit) and a consumer credit, i.e. installment loan without object. The product is less flexible than an overdraft (only 2 action types for receiving money and only once a month), but also less costly than an overdraft. On the other hand, it is more flexible, but also more expensive than a consumer credit with object or mortgage credit. In order to mitigate credit risk, the FLEX contract uses restrictions. For example by defining the minimum number of “Pay” actions required during certain periods (in order to check client solvency), the maximum negative balance, the maximum FLEX base amount, etc. More details on these FLEX restrictions are given in the “Calculation Engine” chapter above. The nature of the FLEX product is that at the start, the target customers (i.e. typically young people) (i) do not know their upcoming financial life events, and (ii) do not have available collaterals. Therefore the use of collaterals to mitigate risks would defeat the purpose of FLEX. However, we can imagine banks gradually requesting collaterals or margin calls, but this is currently out of scope of our FLEX product here. By applying the FLEX restrictions banks can manage the credit exposure risk, even better than is currently the case for consumer loans without object.

The investment part of the FLEX contract can be situated between a saving account and term deposit account. The FLEX product is less flexible than a saving account but provides a better interest rate. It is more flexible than a term account but has a worse interest rate.

From a pricing perspective this means that:

- The credit interest rate (for a positive FLEX contract value) is:
 - slightly higher than a saving account
 - a few base points lower than the corresponding term deposit for the duration of the FLEX contract

For a 20-year FLEX contract, a typical gross interest rate of around 1,25% would be reasonable

- The debit interest rate (for a negative FLEX contract value) is:
 - lower than for an overdraft (currently around 10,5%)
 - lower than for a consumer credit without purpose (currently around 5,5-6%), due to the long-term nature
 - higher than a consumer credit with object or mortgage credit

A typical pricing would be around 3,6%.

Product Roadmap

The product has a few extensions which could be considered, if product becomes successful within the bank, i.e.

- Link the FLEX contract with an insurance product: This insurance product would charge a premium on monthly basis (premium determined by base amount, number of remaining slots where customer needs to pay money and the type of coverage), but customer would be exempted from any remaining payments in case of:
 - Job loss and/or
 - Serious illness of one of the contract owners and/or
 - Decease of one of the contract owners
- As the FLEX contract gives a flexible, but still structured framework for managing finances and can help young families in better balancing their finances, this product has also an interesting political and socio-economical appeal. It could therefore be envisaged that the product would be fiscally promoted by the local governments



Solution overview

The FLEX tool is a packaged software solution, which can be easily configured via parameters and customized via software extensions.

The package is delivered by Capilever, deployed on-premise at the bank (or on a cloud account of the bank) and configured/customized either by Capilever consultants or by the bank itself. Capilever will deliver regular version upgrades, which can be deployed by the bank and for which backwards compatibility of the configurations/customizations is guaranteed.

The software solution consists of 4 parts:

- **Front-end layer:**
 - A white-labelled responsive web front-end, developed in React, which allows to perform all aforementioned functionalities
 - 3 flavors of this web front-end exist:
 - Customer user
 - Bank employee user
 - Administrator
 - Basic style-sheet customizations are possible for these screens, but when bank wants to fully integrate and style in the house-style it is recommended to build their own front-end. As front-end is decoupled from application layer, via well-documented REST-based APIs, these can also be used by the new custom-built front-end



- **Application layer:**
 - Contains all logic described in this document and provides necessary APIs to the front-end layer to provide necessary application logic
 - The layer is built up of several modules:
 - Origination of FLEX contract
 - Calculation engine
 - Servicing of FLEX contract
- **Database layer:**
 - A standard SQL database, with a pre-defined, yet customizable data model
 - A meta-dictionary allowing easy configurability and automatic documentation of the FLEX data model



- **Integration layer:**
 - The FLEX tool needs to be integrated in order to correctly function. Some of the required integrations are:
 - Storing credit contract and (term) investment account in core banking system
 - Send instructions to payment management system for debiting/crediting the FLEX contract
 - Transfer to collection system in case the FLEX contract is not timely reimbursed (i.e. payments not made)
 - Retrieve list of accounts to be used as debit/credit account
 - Retrieve the list of holder compositions for existing contracts in which the customer is already involved
 - The FLEX tool comes with several standard integrations:
 - CPRA tool from Capilever:
 - o The existence of a FLEX contract with many remaining "Receive" action types can improve counterparty scoring for customer
 - NLPT tool from Capilever:
 - o NLPT makes call to FLEX to retrieve value of the FLEX contract(s)
 - 2 types of APIs are used for integration:
 - APIs exposed by the FLEX tool:
 - o Well-documented REST-based APIs to retrieve info (e.g. retrieve value of FLEX contract to show in Daily Banking app) from the FLEX system or make updates to it
 - APIs called by the FLEX tool:
 - o The application layer is foreseen to call several pre-defined REST-based APIs (e.g. for (re)valuation of certain assets), which of course will not match with the bank's services
 - o The integration layer will transform those standard FLEX APIs to the proprietary APIs of the bank
 - The integration layer will also foresee several mocks (against the pre-defined internal REST-based APIs) in order to setup and test the application without integration with the bank systems

Example use case

Nathalie and John are a young couple, both 25 years, who just decided to go live together in an apartment they are renting. Both have a good job, so currently they can save quite some money, but they know this will change in the future. Therefore, they open at their bank a FLEX contract for a period of 25 years for a base amount of 500 EUR. As Nathalie and John have a good financial score, no restrictions are set to the contract.

Nathalie and John follow a quite standard life pattern. After living together for 2 years, their first child is born, and they decide to buy a house. Quite soon they welcome a second child. This brings a quite difficult financial period, with the cost of day-care and their mortgage payments, but furthermore John decides to go work 4/5th, which results in less income. Luckily Nathalie and John opened a few years ago a FLEX contract, so they decide to set the action type to "Receive100%" for a few years (in the contract they have 60 months, during which they can receive the full base amount). A few years later, both children go to primary school, so John decides to work full-time again. This means that they have both less expenses and more income, so they adapt the action type back to "Pay50%". In some months, when it's a bit more financially difficult, they change action type to "Do nothing". About 15 years later, their children go to college, which costs a significant amount of money, so they decide again to receive money from their FLEX plan. Once their kids are graduated, there is more breathing room again to pay back money to the bank.

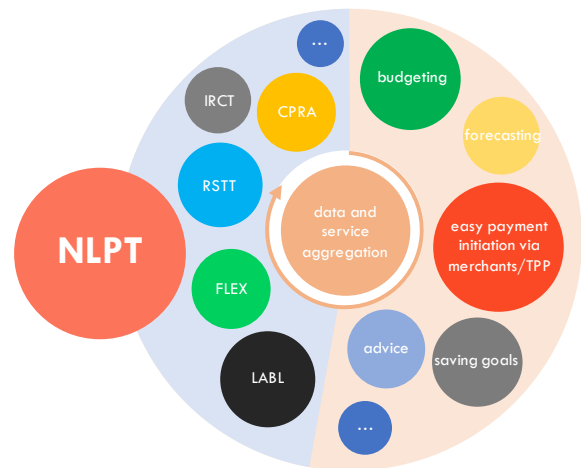


NLPT

Non-liquid position tool

Non-Liquid Positions

A bank's primary goal is to help its customers manage their money. This includes simple depositing of money, easy transferring of money to other persons or legal entities, providing short-term and long-term liquidity and allowing to invest excess money. In order to help a customer in the best possible way with this "task" of money management, **the bank should know its customer as well as possible**. This means knowing all personal and professional details of the customer, but also his personal preferences (e.g. risk aversity, ethical sensitivity...) and his short, medium and long-term financial objectives. But even more important is to get a full, **holistic view of all client's assets and liabilities**. Most banks have a dashboard showing an overview of the client's assets and liabilities deposited at the bank and with the rise of PSD2 most banks will also include an aggregated (current) account overview (including accounts at other banks). But for most customers, this view only gives a small portion of their full wealth, leading to incorrect advice.



Typical assets and liabilities **missing from this overview** are:

- **Financial products:**
 - Financial products at other banks (not included in PSD2):
 - Accounts (saving and term accounts)
 - Securities
 - Credits (mortgages, consumer credits, overdrafts, leasing...)
 - Insurances:
 - Life insurances
 - Pension saving plans
 - Employee benefits:
 - Group insurance plans
 - Option or equity plans
 - Vouchers (meal, eco and gift-vouchers)
 - Unstructured investment products:
 - Private Equity (own company or company in which customer has invested)
 - Direct real estate participation (e.g. participation in acquisition of large real estate like for example an office building)
 - Investments in hotel rooms (e.g. www.the-hotel-investor.co.uk or www.investinrooms.com), holiday parks (e.g. www.centerparcs-investment.com) ...
 - Crowd funding (e.g. Kickstarter, Indiegogo, Patreon, Crowdrise...) & P2P lending investments (e.g. LendingClub, Upstart, Fundrise, Funding Circle...)



CAPILEVER

SMARTLY ACTIVATE YOUR ASSETS

- **Non-Financial products:**
 - Real estate (own usage or for renting)
 - Note that these real estate assets could act already as collateral for a mortgage loan
 - Valuable objects:
 - Art (Antiques, Paintings, Sculptures...)
 - Wine
 - Car/Boat/Plane
 - Collections (stamps, coins...)
 - Intangible valuables:
 - Intellectual Property (Patents, Trademark, Know How, Copyrights...)

Note: a few of the financial products listed above are actual liquid positions. However, as those are deposited at other banks, we consider them as non-liquid positions, as the bank in question does not have any control over them.

Apart from above assets and liabilities, it is also interesting to get an overview of all off-balance positions/services the customer has at its disposal, in order to get a full overview of the customer's wealth. These positions do not increase or decrease the customer's absolute wealth, however they do have an important impact on the customer's wealth and are important for the bank to identify the most appropriate cross- and upselling opportunities.

Examples of such **off-balance products/services** are:

- Off-balance positions offered by other banks/insurers:
 - Credit cards
 - (Unused) overdraft facilities and other revolving credit facilities
 - Non-life insurances like car, home, medical insurances
- Off-balance positions offered by employer:
 - Company car (including fuel card)
 - Insurances
 - Company credit card
- Other off-balance positions:
 - Loyalty programs/cards

In order to capture, maintain and visualize these assets, liabilities and off-balance positions, banks should have a **tool to manage them**. Capilever provides a software solution to efficiently manage those assets and liabilities. This tool called "**NLPT**" (= **Non-Liquid Position Tool**) allows banks to quickly capture this information and manage its lifecycle.

Capilever NLPT software solution

Capilever's "**Non-Liquid Position Tool**" product (= **NLPT**) provides an **end-to-end, user-friendly, white-labelled pre-packaged** solution for managing all customer's assets, liabilities and off-balance positions not serviced by the bank. This solution allows bank employees and customers to input the positions and associated transactions, allow (semi-automated) valuations of the positions and get a full overview of all positions.



Manage non-liquid positions



Transactions on positions



Valorization



Benchmarks and indices



Product dictionary



360° overview



CMS

- **Manage positions** (create/update/delete) – assets / liabilities / off-balance positions:
 - Introduce all details of the position, with info like type, name, classification, status, quantity, ISIN code, date of buy/sell, and indication if position can be showed to customer or not
 - Add (optionally) 1 or more tags to each position
 - Add ownership of position (e.g. alone, me + my partner, my partner, children...).
 - Introduce specific details of the position, specific by asset type, required for automatic valorization, e.g.
 - Picture of object
 - Real estate: address, number of rooms, cadastral income, size (m² total building; m² ground; m² habitable surface)
 - Art: artist, year of creation, type of object...
 - ...
 - When inputting a securities account at another bank, the client has the option to input the securities account as 1 position or to input the individual positions
 - Manual input via screens or upload via Excel files are possible
 - Allow to block/unblock a position as collateral for a credit, including the generation of a digital document that the customer can electronically sign in order to block the underlying asset(s) as collateral
 - Generate alerting to sell position in case of issues with associated credit
- **Manage transactions** on the positions:
 - Either automatically created when adapting the position details or inputted separately in which case the system requests to update the quantity of the specific position
 - Typical info inputted for a transaction is date, nature (Buy/Sell) and quantity
 - Manual input via screens or upload via Excel files
- **Manage valorization** of the positions:
 - Input how a position should be valuated, i.e.
 - Type of valorization:
 - o Manually by customer (= manual input by customer)
 - With workflow for validation by bank employee where bank employee is notified when value is introduced or updated
 - o Manually by bank (= manual input by employee of the bank)
 - o Automatically based on rules:
 - Start from initial value (manually inputted by customer) and then indexed based on benchmark
 - Start from initial value and then reduced with a fixed or relative amount with a pre-defined frequency (e.g. a car reduces in value, so car could be valorized at initial value of 30.000 EUR, with a reduction of 3% every 3 months).
 - o Integrate with external APIs for valuation or balance retrieval, e.g.
 - Integration with API of voucher company (e.g. Monizze, Sodexo, Edenred...)
 - Integration with eStox application of Fednot (i.e. digital security register system) to retrieve private equity positions
 - Integration with government credit bureau to retrieve outstanding balance of credits
 - Valuation of security based on API call using ISIN code of the position to retrieve price
 - Valuation of real estate / art based on external real estate estimator / art estimator
 - Indication whether valorization can be shown to customer
 - Frequency of revalorization
 - Automatic generation of notifications when it is time to re-evaluate a specific position
 - Visualize total value of assets/liabilities of customer
 - Visualize historical evolution of value of a position
 - Calculation of collateral value based on different characteristics (asset type, valuation, last revaluation date and type of valuation)
- **Manage benchmarks / indices:**
 - Allow creation and management of value of different benchmarks/indices, which can be used for valorization indexation e.g.
 - Index of wine prices, e.g. Liv-ex Fine Wine 1000 Index
 - Real estate index, e.g. US REIT Index, MSCI World Real Estate Index...
 - Art index, e.g. ArtPrice100

- **Manage product dictionary:**
 - Bank should be able to link specific info (managed in content management system – see below) to a specific asset/liability type, with additional rules based on customer type, valorization...:
 - Marketing banners
 - Articles/blogs/public hyperlinks
 - Links to chat/mail with expert employees on the product
 - Links to cross-selling product pages (e.g. insurances)
 - Links to external services (e.g. maintenance, storage/safeguarding/conservation, repair/restoration...)
 - Input of product characteristics, used for valorization/collateral value calculation:
 - Default value and allowed values for type of valuation
 - Haircut value for collateral value calculation
- **Give holistic overviews:**
 - Different overview types on screen, but also through generation of reports
 - Grouping of Assets/Liabilities where user can determine grouping criterium
 - Different filters:
 - For bank employee:
 - o All positions of specific customer
 - o All customers with specific asset/liability type
 - For customer:
 - o All positions with specific tag
 - o All positions with specific ownership
 - Possibility to search for specific assets/liabilities on full customer base
 - Create snapshot on specific date. This stores the positions and their value on the current date. User has ability to add a title and comment to the snapshot. E.g. customers wanting to have an end-of-year view on their total wealth. These snapshots are also interesting to evaluate certain situations or changes in life:
 - Couple decides to go live a few years abroad. At that moment it might be interesting to take a snapshot before and after, to see which impact the years abroad have had
 - It can also be interesting for couples deciding to go live together or marry and still have separate accounts. Each person takes a snapshot. Suppose they separate, they take again snapshot and subtract the initial snapshot from it. The delta they divide in 2
 - Ability to view previous snapshot and compare 2 snapshots or current situation with previous snapshot. Tool visually indicates which positions have been added/removed/changed and gives the difference in total value and yearly return
- **Content Management System:**
 - Allow bank to input and upload information/articles/blogs/... on different non-liquid positions
 - This info can be visualized by customers

All modules are exposed by clear and well-documented APIs, so that:

- Positions/Transactions can also be uploaded via APIs, allowing easy integration with existing systems
- Information can be easily extracted, e.g. for generation of holistic reporting





Benefits

A tool to manage the (today largely unknown) non-liquid assets and liabilities of a customer gives many benefits for both the customer and the bank.

Customer Benefits

- All assets of the customer can be used as **collateral** for the flexible and real-time “Asset based loans” (see LABL offering of Capilever)
- Receive a **full holistic reporting** of all assets and liabilities, allowing to get a full overview of the customer’s wealth
- **Improved investment advice**, i.e.
 - Investor profiling based on a full view of the customer
 - No obsolete MiFID suitability warnings, when investments at the bank do not match the customer’s investor profile. For example suppose investor profiling of the customer results in a moderate risk profile, but the customer is using 1 bank to deposit all their low-risk investments, while he uses another bank to do some more aggressive trading. Without a full overview of the customer’s wealth, both banks would give unnecessary warnings & recommendations (1 bank advises to invest more in risky products and the other bank to invest less in risky products)

Bank Benefits

The NLPT tool also provides several advantages to the bank:

- **Extra credits being sold:** generate new business of “Asset-based loans”. Typically, customers would have postponed their acquisition or sold off their assets to meet short term liquidity needs. Now thanks to the increased collateral scope and transparency through NLPT, the customer has more assets at their disposal to act as collateral for “Asset-based loans”, resulting in more potential for requesting asset-based loans. Through defensive collateral weighting, the overall risk of the bank can be correctly managed
- **Increase customer retention:** the higher number of asset-based loans results in a lock-in at the bank, but furthermore the improved servicing as a result of the NLPT tool and the efforts performed by the customer (supported by bank employee) to input all their wealth components, provide a strong lock-in of the customer
- **360° dashboard and reporting** providing a full overview of the customer’s wealth, allowing to:
 - Provide better advice to the customer
 - Better service the customer
 - Avoid any personal Excel files and other unmanaged tools used by bank employees to keep track of important info on customers
- Provide a **larger pallet of services to the customer** with management/advice on non-liquid products and added-value services like insurance, conservation, restauration...
- Identify **more cross-selling opportunities**, i.e. a view on all customer’s assets and liabilities allows to provide additional services or products which customer does not have yet or to provide more competitive offers for products or services that the customer has at competition
- Obtain **better control on compliance issues and risk**

Note: for these non-liquid positions, in case they are used as collateral in the bank for a (LABL) loan, it is not possible to fully guarantee that they are not used as collateral at another bank or that they are not sold during the lifetime of the credit. This risk cannot be fully eliminated, but can be mitigated by several actions:

- By the contract signed by the customer, in which they sign that the position will act as collateral for the credit and that they will not sell or use it as collateral for other credits during the lifetime of the credit
- By applying a large haircut to the value of the asset (typically haircuts of 90% are applied). This large haircut is required for 3 reasons:
 - The risk that the exclusiveness and availability of the collateral cannot be fully guaranteed
 - The liquidity risk, as most of these assets cannot be easily liquidated
 - The uncertainty and lack of continuous updates of the valuation as most of these assets cannot be easily valued
- By requesting the customer to provide regular updates on the state of the assets, e.g. a new picture (with date/time included as meta-data) of the object acting as collateral



Solution overview

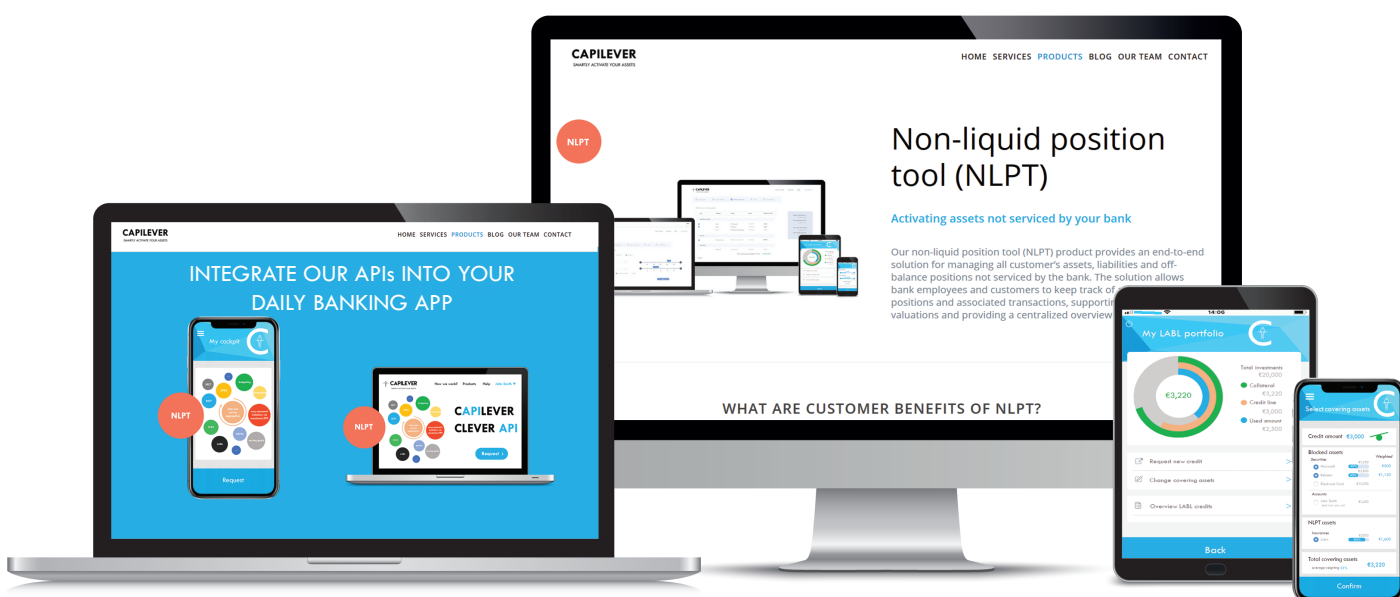
The NLPT tool is a **packaged software solution**, which can be **easily configured** via parameters and **customized** via software extensions.

The package is delivered by Capilever, deployed on-premise at the bank (or on a cloud account of the bank) and configured/customized either by Capilever consultants or by the bank itself. Capilever delivers regular version upgrades, which can be deployed by the bank and for which backwards compatibility of the configurations/customizations is guaranteed.

The software solution consists of 4 parts:

Front-end layer

- A white-labelled responsive web front-end, developed in React, which allows to perform all aforementioned functionalities
- 3 flavors of this web front-end exist:
 - Customer user
 - Bank employee user
 - Administrator
- Basic style-sheet customizations are possible for these screens, but when bank wants to fully integrate and style in the house-style it is recommended to build their own front-end. As front-end is decoupled from application layer, via well-documented REST-based APIs, these can also be used by the new custom-built front-end



Application layer

- Contains all logic described in this document and provides necessary APIs to the front-end layer to provide necessary application logic
- The layer is built up of several modules:
 - Management of positions
 - Management of transactions
 - Position valorization
 - Parameterize the application (product dictionary, CMS...)
 - Collateral value (= haircut algorithm) calculation
 - Monitoring & Alerting
 - Automatic actions (e.g. automatic re-valuation)

Database layer

- A standard SQL database, with a pre-defined, yet customizable data model
- A meta-dictionary allowing easy configurability and automatic documentation of the NLPT data model

Integration layer

- The NLPT system can be used as a stand-alone application, but the application's added value can be largely increased via integrations. Example integrations are:
 - Automatic creation/update of positions/transactions (from specific tools currently used at the bank to manage non-liquid positions)
 - Retrieve positions/transactions for holistic dashboarding/reporting, but also to be used in MiFID investment profiling and MiFID suitability tools
- The NLPT system comes with a standard integration with the Capilever LABL tool. When both modules are acquired by the bank and the bank chooses to allow non-liquid positions to also act as collaterals for asset-based loans, the LABL tool allows to open credits using the non-liquid positions as collateral. Following integrations are foreseen by default:
 - When retrieving assets that can act as collaterals, also a call is made to the NLPT tool. The NLPT tool not only provides all details of the positions, but also their value and collateral value (i.e. the NLPT tool calculates the haircut)
 - If customer decides to use an NLPT (partial) position as collateral for an asset-based loan, the LABL tool makes a call to the NLPT tool to block the position. The NLPT tool blocks the position and returns a contractual document to the LABL tool to be signed by the customer in order to block the corresponding NLPT asset. This is required, as – contrarily to the (liquid) positions deposited at the bank, which can be really blocked – the blocking in the NLPT tool is a conditional blocking, as the bank cannot avoid the asset to be sold when blocked in the NLPT tool
 - The LABL tool also informs the NLPT tool when an asset can be unblocked (e.g. when the linked credit is fully paid back) or when an asset should be sold to solve an issue with a credit
- 2 types of APIs are used for integration:
 - APIs exposed by the NLPT tool:
 - o Well-documented REST-based APIs to retrieve info from the NLPT tool or to make updates to it
 - APIs called by the NLPT tool:
 - o The application layer is foreseen to call several pre-defined REST-based APIs (e.g. for (re)valuation of certain assets), which of course will not match with the bank's services
 - o The integration layer transforms those standard NLPT APIs to the proprietary APIs of the bank.
 - The integration layer also foresees several mocks (against the pre-defined internal REST-based APIs) in order to setup and test the application without integration with the bank systems

Example use case

Michel is very active in real estate. Michel invests all his savings in buying cheap houses, which he renovates and restructures in several apartments, which he rents out. All in all, Michel has already acquired 4 houses, housing a total of 12 apartments. The total worth of these houses is €1,4 million and provides him a rental income of €8.000 per month. Michel would like now to place solar panels on all his 4 houses. This is an investment of €80.000 in total, for which he does not have the necessary liquid money available.

Luckily his bank is an innovative bank, which offers the “asset-based lending” product, also on “non-liquid positions”. Michel inputs his 4 houses with necessary proof documents (like pictures and other official documents) in the tool and a valuation is made at a total of €1,4 million. At a haircut value of 90% the bank can offer him an LABL loan for €140.000 at around 2-2.5% interest rate. Michel decides to block 3 houses in the tool, which gives him a loan of €105.000, allowing him not only to do the solar panel investment, but also to install a heat pump on all 4 houses.



RSTT

Retail Securities Trading Tool

Retail Securities Trading Tool

Due to the low-interest rates, customers are more and more forced to invest their money in securities. While there are many players offering brokerage platforms for the specialized investor or robo-advisors for customers wanting assistance, there is a gap in the market for an **execution-only brokerage tool, focused on the novice investor**, who is not acquainted with all specialized trading terminology and who wishes to minimize his market risk in a simple and transparent way.

RSTT is such a brokerage tool, allowing the customer to easily find a security of a specific risk profile, sector and/or region. When customer has selected a security, the tool shows the impact on the **portfolio diversification** of adding the security to the customer's portfolio (and suggests other securities with same risk profile, sector and currency, but with a better resulting portfolio diversification). When the customer decides to buy a security, the tool will automatically request the customer to **capitalize profits** (of more than X%), **limit losses** (of more than Y%) and **reduce the timing-risk** by automatically spreading out the acquisition over time. All these risk mitigation techniques are presented to the customer in **a graphical way and in layman's terms**.



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IRCT

Interest Rate Comparison Tool

Compare interest rate linked investment & credit products

Banks provide a variety of **interest rate linked credit and investment products**, with a range of interest rate conditions, reimbursement conditions and maturity periods. As a customer who is not a specialist in financial products, it is almost impossible to make a well-informed and quick decision towards the right product. Even if the customer has made himself an idea of how central bank interest rates will evolve in the future, it is still very difficult to **know and quantify the impact on the financial flows** happening during the total lifetime of the product.



At Capilever, we want to help customers **better manage their financial risks** and interest rate risk is a very important element in this. We believe that an intuitive and user-friendly way to compare different products, simulating certain evolutions in central bank interest rates, can help customers get a better feeling of their interest rate risks and **take a more informed decision for a product best fitting their needs** (investment horizon, risk appetite and vision on future evolutions of market interest rates).

The IRCT tool does not make any **comparison** on the quality (i.e. ability of underlying company to reimburse) of an investment product nor on the price of the product. It will merely simulate and compare the cash flows linked to reimbursements and/or coupon/interest payments. This means it also does not consider the options to pre-maturely call/put and/or convert to underlying securities.



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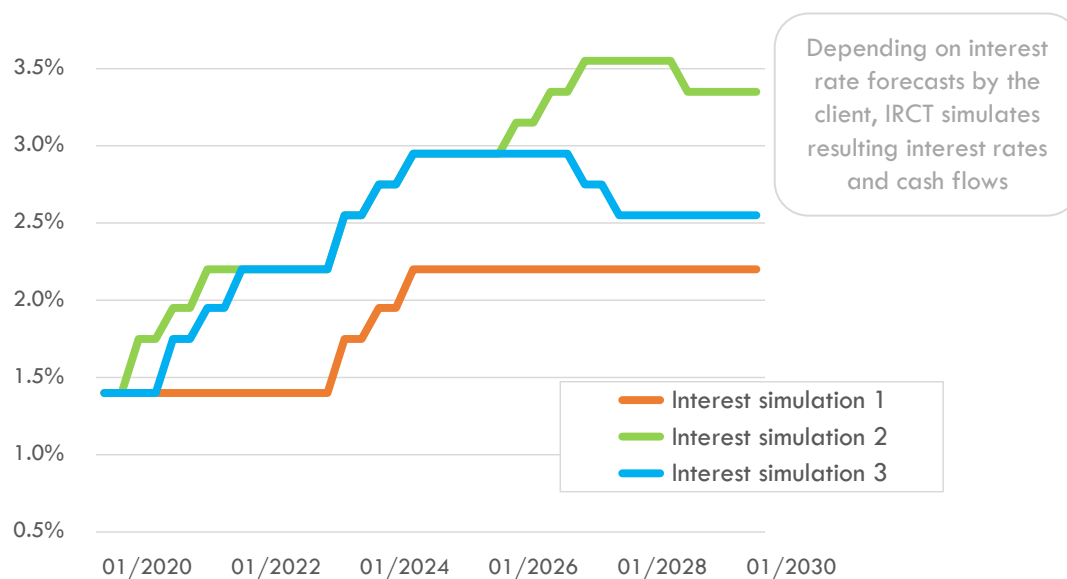
The IRCT tool considers following **criteria** for simulating and comparing different products:

- **Investment products:**
 - Maturity date
 - Interest rate conditions:
 - Fixed
 - Variable but with pre-defined rates (so a set of fixed values), e.g. step-up / step-down
 - Variable by linking to an underlying index/benchmark (with an offset)
 - No interest (discounted in price)
- **Loan products:**
 - Maturity date
 - Interest rate conditions:
 - Fixed
 - Variable by linking to an underlying index/benchmark (with an offset)
- With minimum and/or maximum cap
 - Reimbursement conditions:
 - Monthly reimbursements
 - Balloon
 - Bullet

The tool also allows to forecast inflation rates (adaptable by customer), allowing to discount all future cash flows to present value. their full credit and investment portfolio.

Note: Current loan origination tools allow simulating loan repayment plans taking into account loan amount, duration and interest rate conditions (fixed, variable). However, they usually do not allow the customer to forecast future interest rate evolutions and quantify their impact. Nor do these type simulation tools exist for most investment products. With IRCT the customer can anticipate and mitigate the positive/negative impact of certain interest rate linked scenarios on their full credit and investment portfolio.

IRCT interest simulations & forecasts



Capilever IRCT software solution

Capilever's IRCT software solution provides a **fully automated, end-to-end, white-labelled pre-packaged** solution to **compare different interest rate linked investment and credit products**.

- Step 1 (happening outside the tool): Customer selects the different loan/investment products he wants to compare. It is assumed that this is happening outside the IRCT tool and that the online banking platform then calls the IRCT solution with all relevant info on the selected products, including URL to request the product. This URL redirects the IRCT tool to the screen of Step 2. Note that products do not necessarily need to have the same maturity date.
- Step 2: Customer inputs all parameters required to perform the simulation:
 - Amount to invest/borrow
 - Three questions to be answered with yes/no:
 - When selected products have different maturity periods, IRCT tool asks if customer wants to compare with automatic roll-over
 - When one of the selected products, is an investment product with distribution of interests, IRCT tool asks if distributed interest should be re-invested
 - Ask whether customer wants to apply discounting of future cash flows to present value using forecasted inflation rates
- Step 3: Input of the expected evolution of central bank interest rates
 - This step is skipped, if:
 - All selected products have interest rates that are pre-defined (i.e. not depending on central bank interest rates)
 - All selected products have the same maturity date or customer answered "No" to the first question above (i.e. no automatic roll-over)
 - None of the selected products has distribution of interest or customer answered "No" to the 2nd question above (i.e. no automatic re-investment of distributed interest) (i.e.
 - The screen will show a graph of interest rates with
 - Example evolution of central bank interest over the last 20 years:



- X-axis: from current date till maturity date of products with maximum maturity date
- Y-axis: the interest rate
- On the graph the current central bank interest rate is filled in
- By default, the graph will be filled with current central bank interest rate for all future years
- Customer has the ability to select a few default pre-fillings:
 - o Current central bank interest rate fixed over full period
 - o Evolution from current central bank interest rate to double that rate at the end of the graph
 - o Evolution from current central bank interest rate to 0% at the end of the graph
- The graph indicates the relevant interest rate points to be determined by the customer. These points are determined by:
 - o Date-points at which interest rate is redefined based on central bank interest rate. For example when comparing three different 20 year mortgage credits, i.e. a fixed one, a 3-3-3 formula and a 5-5-5 formula, there is a date-point at 3, 5, 6, 9, 10 and 15, for which interest rates should be set
 - o When comparing investment products:
 - Date-point of maturity of shorter maturing products when customer has requested to roll-over
 - Date-point of interest rate payments on distribution product, when customer has requested to reinvest

- o The customer can move these relevant points up and down (via drag & drop) to define the interest rate he expects
- o Customer can save simulations with specific inputs for future comparison with other products
- o Customer can load a specific past input of interest rates. If the new comparison has other date-points to set, then:
 - When the missing date-point is in between two saved date-points, the default rate is calculated via interpolation. The customer can still overwrite if needed.
 - When the missing date-point is after the last stored date-point, the default rate is set equal to rate of last stored date-point. Again the customer can overwrite this rate for simulation purposes.

- Step 4: Definition of inflation rates
 - This step is optional and only applicable when customer has requested to discount future cash flows
 - This screen is similar to the screen for setting the interest rates (Step 3), i.e.
 - Example evolution of inflation rate over the last 20 years:



- X-axis: from current date till maturity date of products with maximum maturity date
- Y-axis: the inflation rate
- On the graph the current inflation rate is filled in
- By default, the graph will be filled with current inflation rate for all future years
- Customer has the ability to select a few default pre-fillings:
 - o Current inflation rate fixed over full period
 - o Evolution from current inflation rate to double that rate at the end of the graph
 - o Evolution from current inflation rate to 0% at the end of the graph
- The graph indicates the relevant inflation rate points to be determined by the customer. These points are determined by:
 - o Any date at which
 - For a credit product a reimbursement is done
 - For an investment product an (distributed) interest payment or reimbursement is done
 - o The customer can move these relevant points up and down (via drag & drop) to define the inflation rate he expects.
 - o Customer can save a specific input for future comparison (with other products)
 - o Customer can load a specific past input of inflation rates. If the new comparison has other date-points to set, then:
 - When the missing date-point is in between two saved date-points, the default rate is calculated via interpolation. The customer can still overwrite.
 - When the missing date-point is after the last stored date-point, the default rate is set equal to rate of last stored date-point. The customer can still overwrite.

- Step 5: The IRCT tool shows a comparison of selected products:
 - When **comparing investment products**, the tool shows for each product :
 - Total resulting amount
 - Total interest amount
 - Overview of all interest & reimbursement flows
 - When the product has a shorter maturity date than the maximum maturity date of the selected products and the customer has selected to roll-over at maturity date, the IRCT tool also shows in a comparison table:
 - o Total resulting amount at maximum maturity date
 - o Total interest amount at maximum maturity date
 - o Overview of all interest & reimbursement flows (including after roll-over)
 - When customer has requested to discount future flows, each of the above (applicable) amounts in the comparison table will also be discounted to present value and added next to the amount.
- When **comparing credit products**, the tool shows a comparison table with for each product
 - Total repaid amount
 - Total interest amount
 - Overview of all reimbursement flows (repayment schedule)
- When customer has requested to discount future repayment flows, each of the above amounts in the comparison table will also be discounted to present value and added next to the amount.
- The IRCT tool also highlights in color the cheapest product and most expensive product and visually compares the different products in user-friendly graphs. When the customer does not want to consider inflation, the comparison is based on total amount of interests to be paid. When the customer also wants to include inflation, then comparison between the different products is done based on the total amount of interests discounted to present value with the forecasted inflation rate
- The tool allows to generate and store a PDF with an overview of all comparison results
- The tool also shows a button to request each compared product, based on the URL passed in the API call in Step 1. When user clicks on this button, the corresponding product can be automatically requested, which happens outside the IRCT tool and typically within the loan origination or investment system of the bank



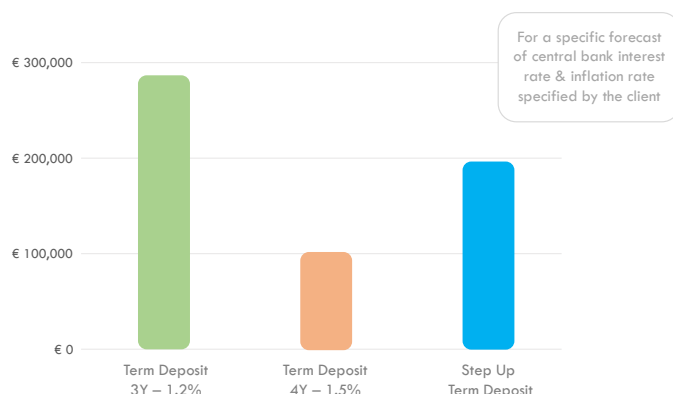
Example visualization:

Investment comparison

- Comparison of 3 investment products
- Customer has requested to reinvest money
- Customer has requested to discount cash flows (discounted values are between brackets)

| | Term Deposit 3Y 1.2% | Term Deposit 4Y 1.5% | Step Up Term Deposit |
|--|--------------------------------|--------------------------------|--------------------------------|
| Total resulting amount | € 10.233,45 (€ 10.166,22) | € 10.303,22 (€ 10.102,22) | € 10.355,66 (€ 10.145,02) |
| Total interest amount | € 233,45 (€ 166,22) | € 303,22 (€ 102,22) | € 355,66 (€ 145,02) |
| Total resulting amount at max. maturity date | € 10.533,45 (€ 10.288,45) | € 10.303,22 (€ 10.102,22) | € 10.378,45 (€ 10.195,02) |
| Total interest amount at max. maturity date | € 533,45 (€ 288,45) | € 303,22 (€ 102,22) | € 378,45 (€ 195,02) |
| Flows | See cash flows | See cash flows | See cash flows |

Compare Term Deposits : Total Discounted Interest Amount



Credit comparison

- Comparison of 3 credit products
- Customer has not requested to discount cash flows

| | Mortgage 20Y - Fixed | Mortgage 25Y - 3/6/9 | Mortgage 20Y - 3/6/9 |
|-----------------------|--------------------------------|--------------------------------|--------------------------------|
| Total repaid amount | € 372.233,45 | € 398.333,45 | € 356.456,56 |
| Total interest amount | € 72.233,45 | € 98.333,45 | € 56.456,56 |
| Flows | See cash flows | See cash flows | See cash flows |

Compare Loans : Total Interest Amount



Note: the tool can also be used by a bank employee. In that case the process remains entirely the same except that the bank employee inputs the conditions of the different scenarios (for example a credit agent in a branch using his tablet device)

Benefits

The IRCT product of Capilever provides an easy and intuitive way to compare investment and credit products, based on a given forecast of the central bank interest rates and (if requested by customer) inflation rate.

Customer benefits

- Take more conscious decision for an investment / credit, with regards to interest rate risk. This means choosing the product that best suits :
 - Customer strategy
 - Customer risk appetite
 - Customer vision on interest rate and (if requested) inflation rate evolution

Bank Benefits

- Improved customer service: better informing customers about the impact of choosing a specific product. Thanks to the IRCT tool the customer can easily compare the impact of changing interest (and inflation) rates on the expected revenues (when investing) or costs (when lending) for the different products offered by the bank
- Assist bank employees in better providing advice to customers. For example when comparing a mortgage of 20 years with fixed interest rate, compared to a 3/6/9 variable interest rate formula, with a cap of maximum 2%
- Banks can provide more innovative interest-linked investment/credit products, as tool can explain easily how the product will evolve when interest rates fluctuate



Solution overview

The IRCT software package is a **packaged software solution**, which can be **easily configured** via parameters and **customized** via software extensions.

The package is delivered by Capilever, deployed on-premise at the bank (or on a cloud account of the bank) and configured/customized either by Capilever consultants or by the bank itself. Capilever will deliver regular version upgrades, which can be deployed by the bank and for which backwards compatibility of the configurations/customizations is guaranteed.

The software solution consists of 4 parts:

- **Front-end layer:**
 - A white-labelled responsive web front-end, developed in React, which allows to perform all above described functionalities
 - 3 flavors of this web front-end exist:
 - Customer user
 - Bank employee user
 - Administrator
 - Basic style-sheet customizations are possible for these screens, but when bank wants to fully integrate and design in the house-style it is recommended to build their own front-end. As front-end layer is decoupled from application layer, via well-documented REST-based APIs, these APIs can also be used by the new custom-built front-end
- **Application layer:**
 - Contains all logic described in this document and provides necessary APIs to the front-end layer to deliver the full application logic
 - This layer is built up of 2 modules:
 - Workflow module: module managing the process and screen flow, i.e. determining which step and which information to be shown to the customer at a certain moment
 - Calculation module: module to calculate all simulations, comparisons and resulting graphs based on the provided information
- **Database layer:**
 - A standard SQL database with a pre-defined, yet customizable data model
 - A meta-dictionary allows easy configurability and automatic documentation of the IRCT data model
- **Integration layer:**
 - The IRCT tool will need to be integrated in order to operate correctly. Some of the required integrations are:
 - API to receive product information of products to be compared
 - API to retrieve current central bank interest rate and/or current inflation rate
 - API to retrieve the results of a simulation done in the IRCT tool
 - 2 types of APIs:
 - APIs exposed by the IRCT tool:
 - o Well-documented REST-based APIs to retrieve information from the IRCT tool. For example in order to retrieve results of a simulation to be used in the Daily Banking app
 - APIs called by the IRCT tool:
 - o The application layer is foreseen to call several pre-defined REST-based APIs (e.g. for (re)valuation of certain investment assets), which of course will not match with the bank's services
 - o The integration layer will transform those standard IRCT APIs to the proprietary APIs of the bank
 - The integration layer will also foresee several mocks (against the pre-defined internal REST-based APIs) in order to setup and test the application without integrating with the bank systems

Example use case

Emily and Peter want to buy a house and need to take a mortgage loan. After careful comparison between different banks, they found that their own bank gives the best interest rates and service. After a visit to their branch, the bank employee has made several offers for Emily and Peter, i.e.

- A fixed-rate offer for 30 years at 2,1%
- A fixed-rate offer for 20 years at 1,7%
- A variable-rate (formula 1/1/1) offer for 20 years at 1,5% (with cap of +2%)
- A variable rate (formula 3/6/9) offer for 20 years at 1,6% (with cap of +2%)

Emily and Peter now need to decide which formula fits best with their budget and future expectations and risk profile. Luckily their bank offers the IRCT tool of Capilever. When they logon to their online banking the 4 products offered by the bank are automatically available. Emily and Peter select the 4 products for comparison and enter a first situation of a bank interest rate (e.g. Euribor) staying flat at 1,2% for 30 years. The tool automatically shows how the 4 formulas react to this situation and what are the resulting reimbursement tables.

Afterwards, Emily and Peter look at a few other scenarios, e.g. scenario where interest rate doubles after 1 year and triples after 3 years. And a scenario where interest rate gradually increases with tiny bits and then drops again after 10 years.

Based on all these comparisons Emily and Peter decide to go for the variable rate (formula 1/1/1) as it best suits their expectations of future interest rate evolutions.



CPRA

Counterparty Risk Assessment

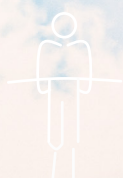
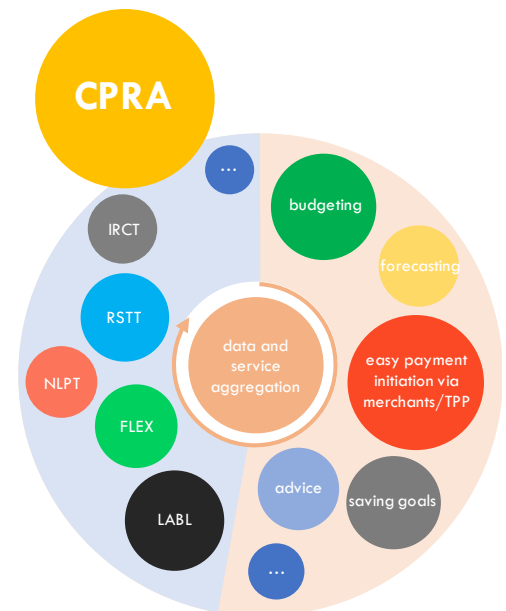
Counterparty Risk

At Capilever we believe banks should help their customers with managing their money and all associated financial risks. A risk which is often underestimated but that can have severe financial impacts, is counterparty risk. When investing in bonds this risk is quantified by a rating coming from rating agencies like S&P, Moody's or Fitch, but for direct peer-to-peer transactions there are no tools to get a quick and cheap quantification of the risk to transact with a given counterparty.

For SMEs, often not having lots of reserves, trusting the wrong customer can be a disaster. At the same time, customers also want to avoid making deals with fraudulent or malicious companies (SMEs) and persons.

Here are some examples of transactions benefiting from a good counterparty risk assessment:

- Hiring a building contractor for a renovation: avoid hiring a contractor that is close to bankruptcy or even worse who is fraudulent.
- Renting an apartment/house: already today, homeowners are asking a proof of salary to determine the financial health of a renter. This salary form gives a lot of personal details (which the homeowner shouldn't necessarily need to know), can be easily counterfeited and gives only a limited view (customer could have other assets or could have large liabilities). A quantitative risk scoring of the counterparty, potentially combined with a certificate confirming the customer's ability to pay the monthly rent, can be a perfect alternative for this.
- Buying real estate: often people buying a house only start applying for their mortgage when the home sales agreement has been signed. In Belgium for example this leads to 20% of home sales being cancelled, as the necessary mortgage cannot be obtained. This is a large cost for the seller, as it means the selling process needs to start all over again, increasing the time to sell the house with a considerable length. If the buyer can already present a certificate/proof - which can be easily obtained online and without any binding nature for the buyer with the bank - it can show already the credit worthiness of the buyer before signing the sales agreement and reduce this percentage of sales cancellations.
- Peer-to-peer lending platforms: the bank could monetize the counterparty risk scoring as an API for credit scoring of someone borrowing money on a peer-to-peer lending platform.
- IT contract: when a company signs a long-term IT contract with a smaller IT company, often a financial due diligence is required, to mitigate the risk of bankruptcy of the IT firm during the IT project. This due diligence process could be simplified by an easy counterparty risk scoring - with potential certification - offered by a financial institution.



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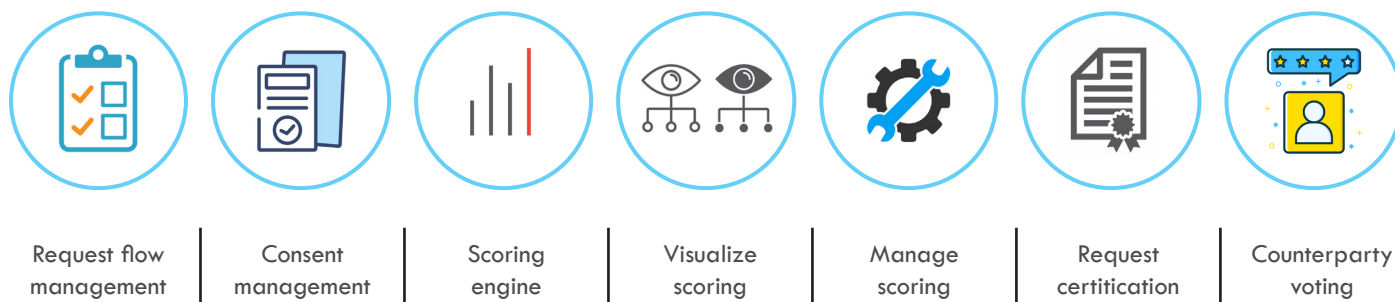
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Capilever CPRA software solution

The CPRA tool (= **Counterparty Risk Assessment tool**) of Capilever provides a solution for better managing counterparty risk and supporting the use cases described above. The tool allows a customer (SME or Retail customer) to **ask a risk assessment of another customer**, while respecting all privacy concerns of GDPR, via an extensive consent management system.

Additionally, the tool offers possibilities to improve your scoring, give a vote to a counterparty or request a certificate that customer is financially sound for a specific amount.

The tool consists of following modules:



Request Flow Management

- After a customer is authenticated on the online banking platform, the customer can request the counterparty scoring information of another customer. This is done by first selecting the type of customer (physical or moral customer), followed by a unique identification of the customer, i.e.
 - For physical person: 1 of 3 options:
 - First name + last name + birth date
 - National Registry Number
 - ID card number
 - For moral customer: 1 of 3 options:
 - Name of company
 - Enterprise number
 - VAT number
- In this screen, the user also needs to input a reason/comment for requesting the scoring
- When counterparty's visibility preference is set to automatic approval (for this type of customer), the request is immediately approved, and the user can continue to the scoring visualization

Consent Management

In the consent management module, a user can manage who can view their risk score. There are 4 sub-modules here:

- Manage visibility preferences:
 - User can decide between 3 visibility modes:
 - Fully open: everyone can see their risk scoring information, i.e. a scoring request is automatically accepted for any user requesting the info
 - Open for all retail customers: when a retail customer requests scoring information, the request is automatically accepted, while for a company manual consent needs to be granted
 - Only open upon explicit request and consent: each request needs to be manually approved
- Manage all access requests:
 - Overview of all access requests (pending requests and requests which have already been answered)
 - See details of a request, i.e. details of person / company requesting access and reason/comment for request
 - Grant/Reject access request
 - When granting access, the user (company or retail customer) can
 - o Add some explanation/comment for the risk scoring
 - o Give an end date for the access to the scoring information

- o Improve their scoring for this specific request by:
 - Blocking a certain amount as guarantee. This means that an account is automatically opened at the bank, on which a specific amount is credited and on which the requesting counterparty has a mandate, in such a way that money can only be withdrawn from the account with explicit approval of both parties. This option improves both the solvability and liquidity scoring for this request
 - Provide access to information on social media. This option improves trustworthiness score for this request
 - Automatically send an invitation to connect on social media. This option improves trustworthiness score for this request
 - When rejecting access, the user can provide a comment why they are rejecting
- Overview of all granted and active (i.e. end date not passed) consents:
 - View all details of requesting party & request
 - Link to all view requests associated with that specific consent (see below)
 - Ability to revoke an access, with possibility to provide reason for revoking
- Overview of all view requests for counterparty by other persons/companies, i.e. each access to user's scoring is registered and tracked. This screen has the option to report abuse of a counterparty, in case excessive access is identified by a user

Calculate scoring

- When a user requests a scoring, the scoring is calculated in real-time, based on the current available information. The scoring results are grouped in 3 risk labels, ranging each from A to E:



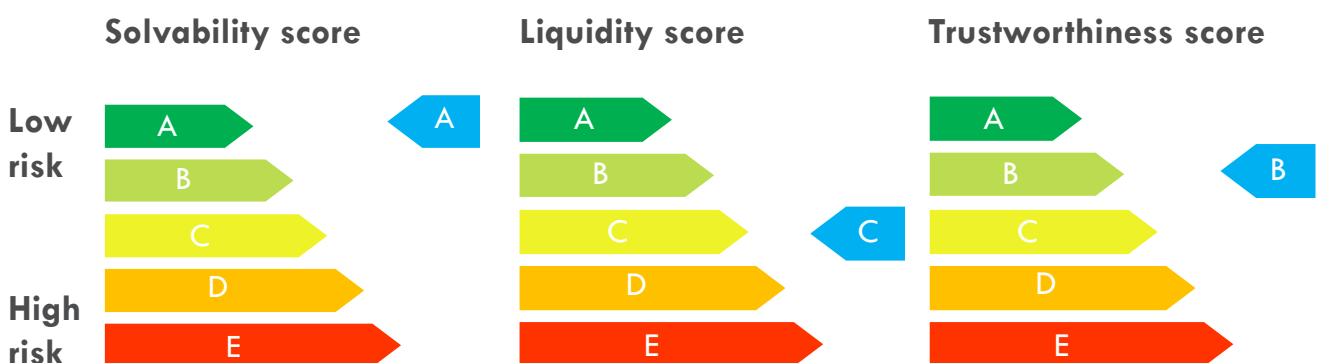
- The 3 risk labels are:
 - **Solvability:** a score based on the overall wealth of a customer. The more wealth (i.e. assets minus liabilities) a customer has the higher the score. Scoring is based on:
 - First retrieve a valuation of the overall wealth of the customer (handled by calls to cash, securities and credit systems and to the NLPT tool of Capilever)
 - Retrieve from configuration the "median wealth" for the country in which the bank is operating
 - Categorize:
 - o More than "2 x Median" : A
 - o Between "1.35 x Median" and "2 x Median" : B
 - o Between "0.85 x Median and 1.35 x Median" : C
 - o Between "0.5 x Median and 0.85 Median" : D
 - o Less than "0.5 x Median" : E
 - These boundaries can also be configured in the CPRA tool
 - **Liquidity:** how much of user's wealth can be easily liquidated:
 - Retrieve all available assets (handled by calls to the cash and securities systems, and to the NLPT tool of Capilever) and asset types
 - o Note: all assets blocked as collateral are excluded
 - For each asset type, take a haircut based on the liquidity of the asset type (cfr. Capilever LABL product)
 - Add to this the available overdraft and available LABL balance (cfr. Capilever LABL product)

- Compensate this with
 - o Estimation of user's saving capacity (income minus expenses on a monthly basis)
 - o Available slots on Capilever's FLEX product
- Categorize again in 5 categories, based on the calculated liquidity amount, compared (with boundaries) to a median liquidity amount set by the bank
- **Trustworthiness:** what is the risk that a user will not be paying/delivering a service/product, even though the user has the necessary solvability and liquidity. This risk scoring is a more complex algorithm based on 3 elements:
 - Social score: an indication how well the user is involved in social life. This is calculated by connecting to LinkedIn and/or Facebook and comparing customer data and scoring the customer's friend graph:
 - o Check if info in social media corresponds with the referential data stored in the bank's referential (the more it matches, the higher the score)
 - o The more connections the higher the social score
 - o The higher the risk score (solvability, liquidity and trustworthiness, with higher weight on trustworthiness) of the connections, the higher the social score
 - o Any recommendations or voting done within the CPRA tool
 - Financial score: an indication if user is managing well their financials (paying bills in time, necessary insurances in place, etc.)
 - KYC score: banks already have a risk scoring in their KYC process. This score is also considered
- The above scoring is the general scoring of the customer. The scoring can however be increased for a specific request based on actions taken by the user when granting request, i.e.
 - Blocking amount on account will increase solvability and liquidity score
 - Granting access to social media info and/or make a connection request will improve trustworthiness score

Visualize scoring

Once a user has received consent (automatically or manually) from counterparty to visualize scoring of counterparty, the user can visualize the scoring:

- User gets an overview of all counterparties that have given consent and for which scoring can be retrieved
- When visualizing the scoring, the user sees the 3 risk labels and any additional information like:
 - Additional actions taken by counterparty to improve scoring for this request
 - Comments added by counterparty when granting consent
 - End date of the consent
 - Any certifications which were created for the requesting party



Manage scoring

This module allows a customer to influence their scoring, i.e.

- Manage access to external tools for assessing trustworthiness:
 - Grant access to Facebook
 - Grant access to LinkedIn
- Action buttons to improve components of the score:
 - Solvability:
 - Input / update NLPT tool, with any missing assets (and potentially do a revalorization)
 - Liquidity:
 - Input / update NLPT tool with any missing liquid assets at other banks
 - Foresee more liquid assets, by selling non-liquid assets deposited at the bank
 - Open an LABL framework agreement, with an LABL overdraft facility, using non-liquid positions as collateral. Normally liquid assets are used in LABL, but through the necessary defensive measures non-liquid assets can also be blocked (applying very defensive haircuts, digital contracts while blocking registered non-liquid assets, regular photos of certain types of non-liquid assets (e.g. art), etc.). See NLPT offering of Capilever for more details
 - Increase or free-up overdraft facilities
 - Open a FLEX contract agreement
 - Trustworthiness – Social score:
 - Grant access to social media
 - Align social media customer data with referential data stored at the bank
 - Increase level of openness of Counterparty Risk Information (transparency)
 - Request a recommendation/vote of friends/colleagues on Facebook/LinkedIn
 - Trustworthiness – Financial score:
 - Increase number of standing instructions / direct debits

Request Certification

Via this module a customer can request a proof that a counterparty is capable to pay a certain amount of money and/or borrow a certain amount of money

- Customer inputs:
 - Action type: “paying money” or “borrowing money”
 - Certification amount
 - When action type is “paying money”, the customer inputs the payment frequency, whether it is a one-shot payment or regular (e.g. monthly) payment
 - When action type is “borrowing money”, the customer inputs the type of loan (mortgage or consumer loan)
- After this input, the system determines if certification can be offered. If not, the reason is provided
- If certificate is delivered, it can be downloaded as PDF or shared with customer of the bank. User can search customer or select a customer who made a risk scoring request. If a customer who made a risk scoring request is selected, the certification is automatically linked to the last request
- User also gets an overview of all granted certifications, allowing to link them later to any ongoing scoring request

Counterparty voting

- User can provide a positive/negative feedback or vote (cfr. TripAdvisor) to counterparty, including comment and reason
- There are 3 types of reasons for voting:
 - “Recommend”
 - “Feedback on transaction”
 - “Report abuse” (when risk scoring information is misused – e.g. publicly shared or continuously requested/followed-up)
- User can only make a feedback to a counterparty when one of following options are met:
 - Counterparty is a connection on LinkedIn or Facebook (only for reason equal to “Recommend”)
 - User has recently made a counterparty scoring request to the counterparty, which was accepted
 - Counterparty has made a counterparty scoring request to the user, which the user accepted
 - User can provide proof of transaction with the counterparty:
 - Directly if payment was done via cash account of the bank
 - Via PSD2 if transaction was made on an account at another bank
- Overview of all votes you have made, with possibility to update / delete a vote made in the past
- Overview of all votes you have received, with possibility to give comments on a specific vote

Note: a customer can be blocked from the CPRA tool by a bank employee if feedback abuse is reported



Benefits

The CPRA tool of Capilever allows to manage, share and enhance counterparty financial risk.

Customer benefits

- SMEs can better assess if they want to accept or not a specific job, based on the financial steadiness of a customer. If needed, they can adjust their pricing, to compensate for extra counterparty risk
- Furthermore it can be interesting if SME wants to work with partners or wants to procure goods/services from vendor with delayed payment (vendor can check SME)
- Customers can do a check if a professional or company is to be trusted from both a social and financial perspective
- SME can generate more revenue as it can showcase to customers its financial stability and good feedback from customers
- Improved financial advice from the bank, based on information collected in the CPRA tool

Bank Benefits

The CPRA tool also provides several advantages to the bank:

- Extra service to customers. Potentially this service can even be monetized by asking commission to SMEs
- Strong customer retention. Leaving the bank would mean SMEs cannot share their financial counterparty score anymore with customers
- Allows generating extra revenues, via financial products improving financial risk profile
- Interesting info collected from customers (e.g. votes) for KYC purposes, improved financial advice and credit risk scoring

Solution overview

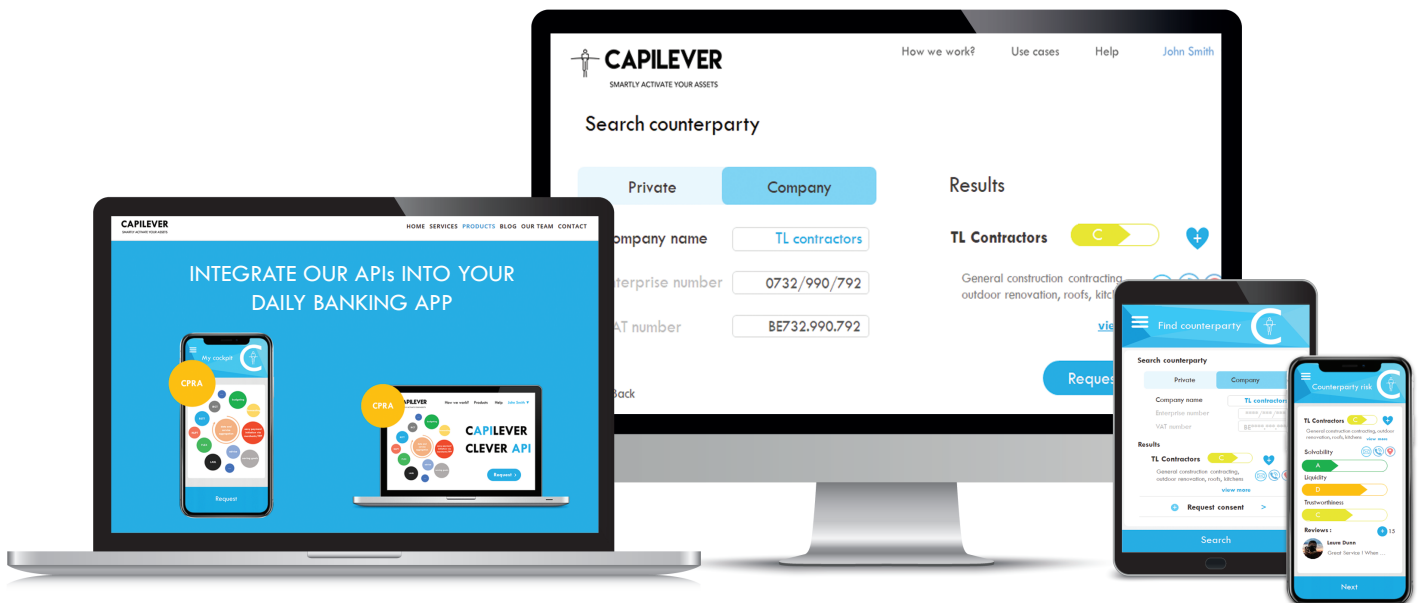
The CPRA tool is a packaged software solution, which can be easily configured via parameters and customized via software extensions.

The package is delivered by Capilever, deployed on-premise at the bank (or on a cloud account of the bank) and configured/customized either by Capilever consultants or by the bank itself. Capilever delivers regular version upgrades, which can be deployed by the bank and for which backwards compatibility of the configurations/customizations is guaranteed.

The software solution consists of 4 parts:

Front-end layer

- A white-labelled responsive web front-end, developed in React, which allows to perform all aforementioned functionalities
- 3 flavors of this web front-end exist:
 - Customer user
 - Bank employee user
 - Administrator
- Basic style-sheet customizations are possible on these screens, but when bank wants to fully integrate and style following the house-style it is recommended to build their own front-end. As the front-end layer is decoupled from the application layer, via well-documented REST-based APIs, these can also be used by the new custom-built front-end





Application layer

- Contains all logic described in this document and provides necessary APIs to the front-end layer to provide necessary application logic
- The layer is built up of several modules:
 - Request flow management
 - Consent management
 - Calculate scoring
 - Visualize scoring
 - Manage scoring
 - Counterparty voting
 - Request certification

Database layer

- A standard SQL database, with a pre-defined, yet customizable data model
- A meta-dictionary allows easy configurability and automatic documentation of the CPRA data model

Integration layer

- The CPRA system comes with several standard integrations:
 - LABL tool from Capilever:
 - Check if a customer has an active LABL framework agreement and whether an available amount exists on the collateral portfolio
 - Open an LABL framework agreement as an action to improve counterparty risk scoring
 - NLPT tool from Capilever:
 - Retrieve full wealth overview of customer as input for counterparty risk assessment
 - FLEX tool from Capilever:
 - Check if a customer has an active FLEX contract and how many slots remain during which customer will receive money
 - Open a FLEX contract as an action to improve counterparty risk scoring
 - Social media like Facebook and LinkedIn
 - Authentication flow with Facebook and LinkedIn
 - Compare customer referential data in Facebook/LinkedIn with bank's customer referential data
 - Retrieve overview of all friends/connections

- 2 types of APIs:
 - APIs exposed by the CPRA tool:
 - Well-documented REST-based APIs to retrieve info (e.g. scoring of a customer) from the CPRA tool or make updates to it
 - APIs called by the CPRA tool:
 - The application layer is foreseen to call several pre-defined REST-based APIs (e.g. for (re)valuation of certain assets), which of course will not match with the bank's services
 - The integration layer transforms those standard CPRA APIs to the proprietary APIs of the bank
 - o The integration layer also foresees several mocks (against the pre-defined internal REST-based APIs) in order to setup and test the application without integrating with bank systems

Example use case

Diane wants to renovate her house. Via a website to find building contractors, she has received 3 offers from contractors. Prices are quite similar, but Diane doubts about the trustworthiness of the 3 contractors. Luckily Diane's bank offers the CPRA tool of Capilever.

Diane logs on to bank online tool and looks up the 3 contractors. 2 out of the 3 contractors are indeed customer of the bank and use the CPRA tool. Both contractors have however restricted access to their financial risk profile (not public for everyone), so Diane sends a request for consent to see their financial profiles. A few hours later 1 of the 2 contractors has accepted the consent request. Diane sees that this contractor is financially very sound and furthermore has 3 very positive feedbacks of customers also using the CPRA tool. Diane is convinced that this contractor is a good choice and accepts the offer.

After 3 months, the renovation is successfully finished. Diane is very satisfied of the contractor's work. The contractor asks to give a positive feedback. Diane logs on to the online banking tool and goes to the CPRA tool. Diane selects the contractors and gives a very positive feedback. As proof of transaction, Diane uploads the bill and some pictures of the renovation. This information is only visible to the bank and to the contractor but can be used in case of debate of the trustworthiness of the feedback.



About us

Capilever is a software company that helps financial institutions prepare for the next wave of **Open Banking** with focus on **Credits** and **Investments**.

Our team of technology and banking finance experts has joined forces to deliver world-class **investment-and-lending white-labelled software solutions** for the financial services industry.

All products in Capilever's product offering are software solution sold to banks to assist their customers in **better managing their financial risks** (from liquidity risk management, market and interest rate risk, up to counterparty risk).

All products come with several **well-defined APIs**, which can be easily integrated within the bank, with strong focus on orchestration and **automation** of underlying **credit and securities processes**.

CAPILEVER

CLEVER API