

fintech  OS

Mobile Retail Loan Origination 1.0

User Guide

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Overview

Mobile Retail Loan Origination is a complex digital journey that allows a customer to apply for a loan personalized to their needs. By first inserting data into a simulator, the software returns a tailored loan product to fit the scope and needs of an applicant. Throughout the process, the identity of the customer is checked and they can choose the amount, period and added benefits or even opt for credit cards and debit cards. At the end of the process a current account is opened, the money is disbursed to an account and if selected a credit/debit card is shipped. The journey has elements such as **gamification**¹ introduced into the flow as a solution for reducing the waiting by presenting the user with a game. Lastly, to ensure the customer experience is enjoyable a feedback form was inserted to collect the opinion of the user and the possibility to invite a friend by inserting their email address and get a discount applied. All these elements, ensure a round flow with milestones, achievements and user-friendly visual elements.

The user is an **Un-Authenticated Customer** (a new customer to the bank, un-authenticated in the Portal) and the customer segment is **retail individuals**.

The digital journey is built for mobile mode with a user interface easy fitted for smaller screens. The journey can be used in desktop mode as well, cross-platform with slight modifications on the flow on the step "[Know Your Customer](#)" on page 27.

Business Pain Points

The Mobile Retail Loan Origination digital journey by FintechOS is aimed at resolving some of the pain points when applying for a loan:

- the application takes time to fill in;
- requires various documents to verify identity;

¹The application of typical elements of game playing (e.g. point scoring, competition with others, rules of play) to other areas of activity, typically as a technique to encourage engagement with a product or service.

- customers rely on information received from clerks;
- to many fields to be configured and data to be collected;
- multiple steps to be performed by the user.

The Mobile Retail Loan Origination journey by FintechOS solves these pain points by offering a fully digital seamless way for your customers to apply for a loan.

Advantages of the Mobile Retail Loan Origination:

- Digital - the application is 100% digital as well as the disbursement. The result is a fully functional loan, personalized and generated without the need for a lot of documents.
- Time-efficient. The process has only a few steps with instructions to easily navigate.
- Personalization. This digital journey is highly configurable and can be further enhanced via FintechOS Studio to adapt it to your business requirements.
- Advanced formula for calculation. The processor "[Configuring the Business Formulas](#)" on [page 92](#) offers an intricate method to build a formula that can calculate the interest rates.
- Unassisted. The journey does not require the assistance of a bank employee for the user to receive their loan. It can be done by any customer.

Solution Walkthrough

The Mobile Retail Loan Origination digital journey enables a user to apply for a loan and receive it at the end of the process. It is powered by automation processors such as ["Configuring the Banking Products" on page 99](#), ["Configuring the Business Formulas" on page 92](#), and ["Configuring the Business Workflows Processor" on page 83](#). It is configurable to fit the business needs of any financial institution by use of such micro-services.

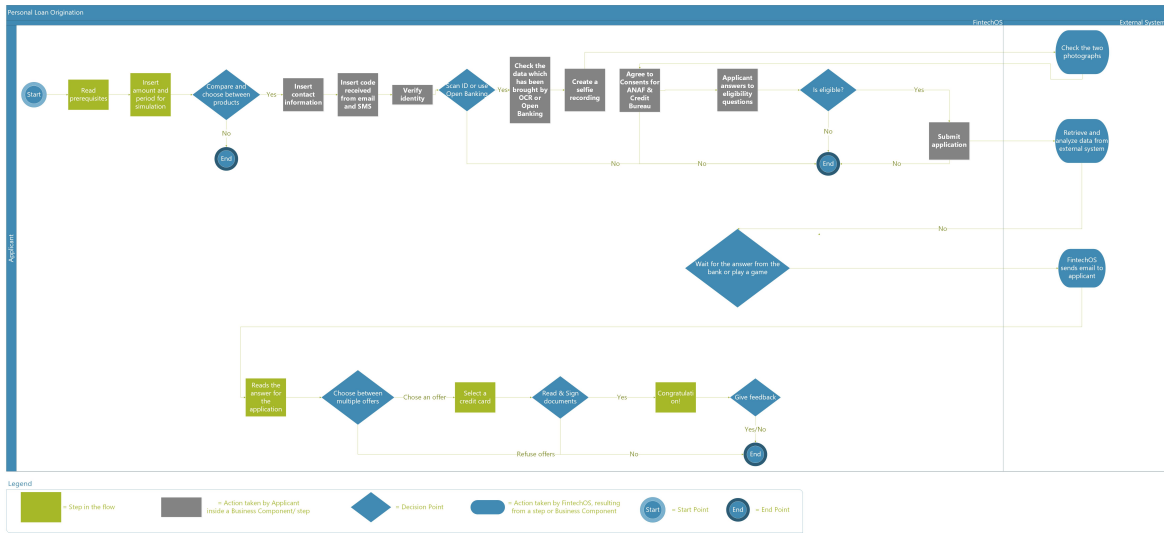
For example, Jane Doe wishes to travel to the Canary Islands this summer, but she has already spent her wage on car repairs. She scans the loan market and arrives to this solution. Within a few clicks, FintechOS has identified her, has confirmed her income and expenses, has calculated her DTI and can safely approve her a loan to buy the vacation.

The type of destinations for the loan are:

- Car Loan
- Home Renovation Loan
- Do-it-yourself project
- Medical Loan
- Consumer Loan
- Vacation Loan
- Not specified.

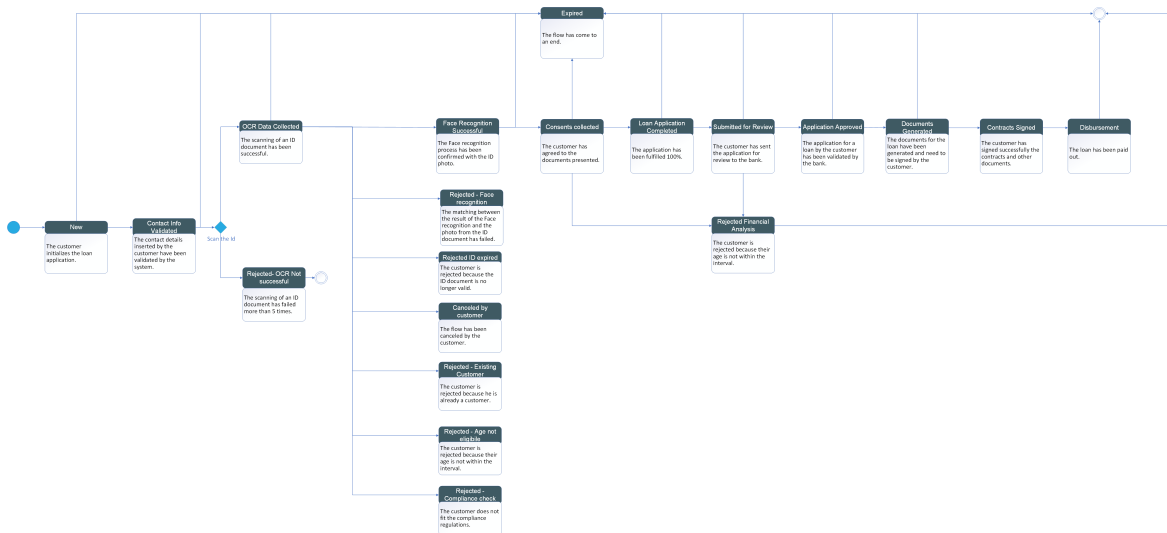
Below is a UML diagram showing the main actions that the user takes to create a loan. For details, see ["Configuring the Business Workflows Processor" on page 83](#).

MOBILE RETAIL LOAN ORIGINATION USER GUIDE



To download the diagram, click [here](#).

The image below describes a detailed Mobile Retail Loan Origination workflow containing the statuses the journey passes through. For each status, there is an explanation as to what action it corresponds to. The transitions between statuses are displayed as well.



To download the diagram, click [here](#).

To receive a loan (opening a current account, contracting a loan and optionally a credit card), an un-authenticated customer visits the following pages which mark milestones in the process:

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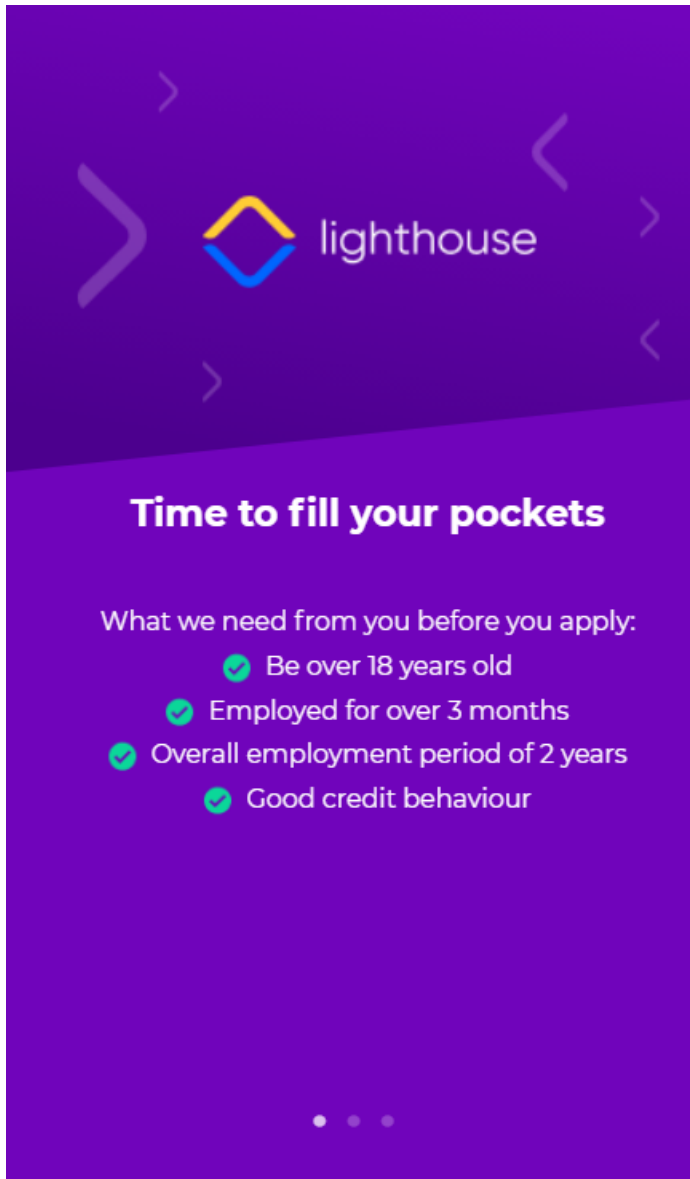
Welcome screens

The first screens are meant to explain to the user the requirements for eligibility and the steps of the flow to apply successfully for a loan. An overview is given to the applicant to inform them about the flow, the mandatory requirements to be fulfilled to receive the disbursement in an orderly fashion.

NOTE

The welcome screens are placeholders where a bank can display marketing content about the loan process and the products it offers or photographs. Depending on the

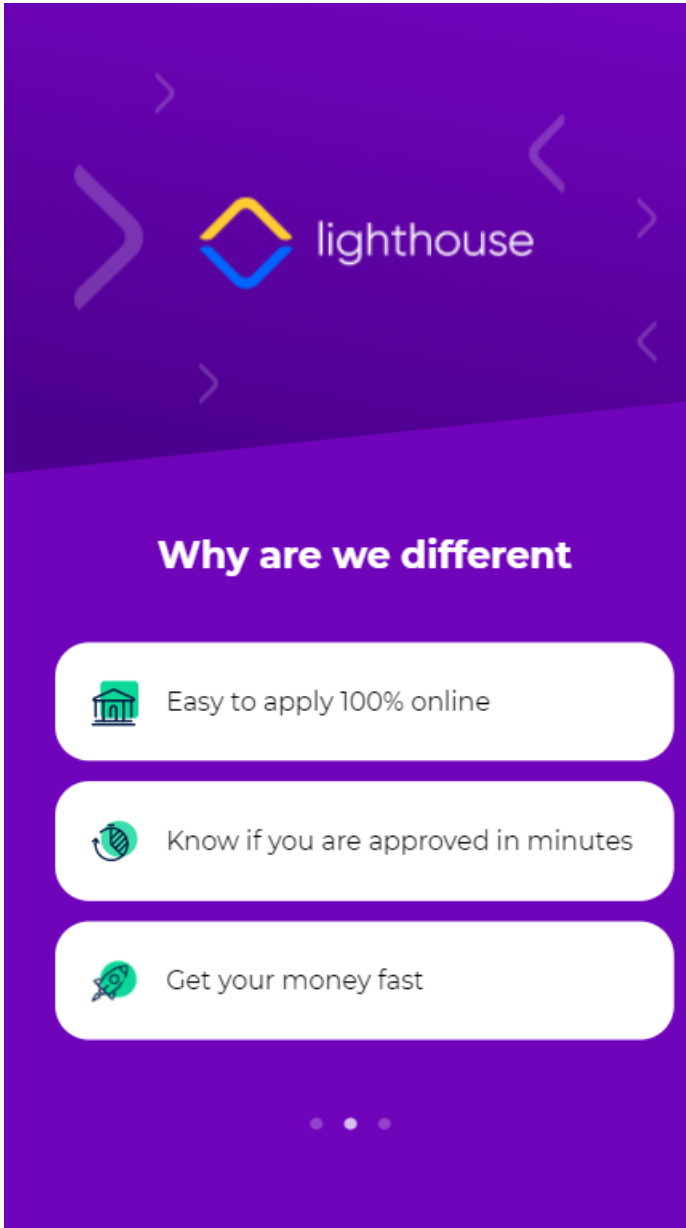
branding and advertisement strategies, a bank can use this space for commercial use.



In order to apply, the potential customer must meet the following conditions:

- be over 18 years old
- be employed for over 3 months at the current job

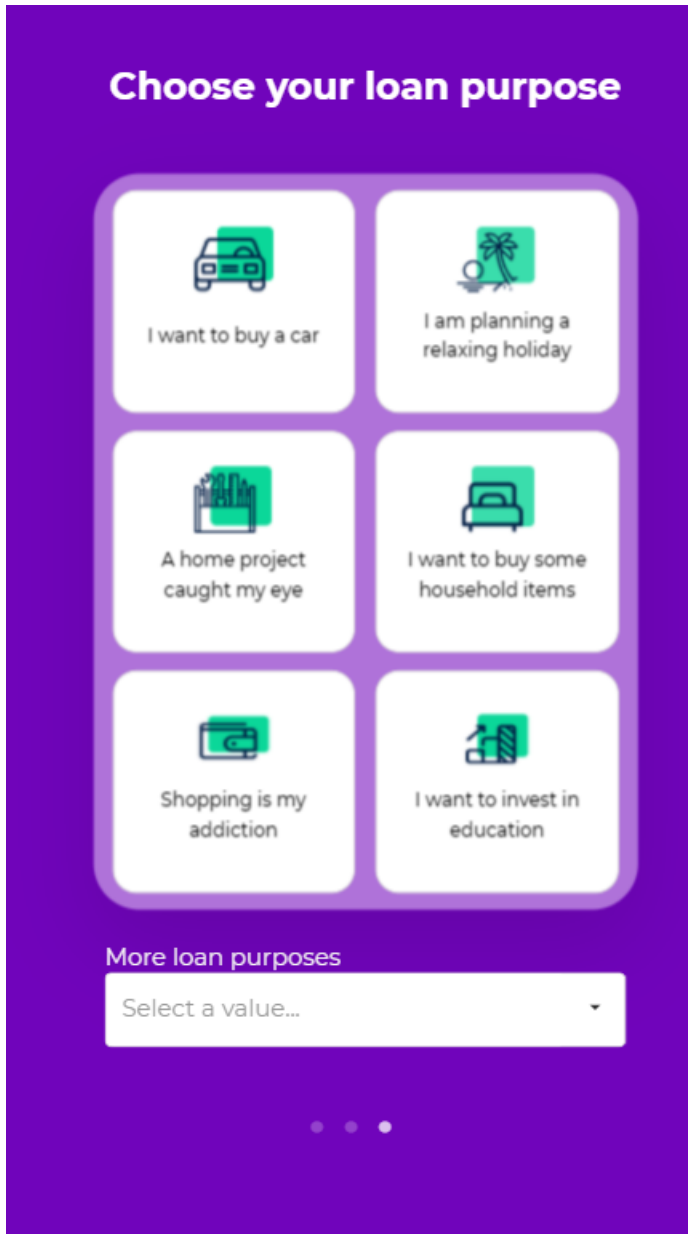
- have an overall employment period of two years
- have good credit behavior.



The second screen explains explains some of the advantages of the current solution:

- 100% online
- receive the money at the end

- the approval is fast.



The following screen urges the customer to choose a loan purpose from the following list.

- A home project caught my eye
- For funeral expenses

- I am planning a relaxing holiday
- I don't wanna disclose my loan destination
- I have a medical urgency
- I need some new tech products
- I want to buy a car
- I want to buy some household items
- I want to invest in education
- I'm planning a wedding
- Legal fees
- Other
- Shopping is my addiction.

Depending on the chosen purpose, a list of bank products is returned. Each purpose is mapped to a banking product, hence, this choice is very important to suggest to the customer a recommendation that would fit the need. Each purpose is different: different amounts, interest rates, and some may require additional features such as insurances. By identifying the customer's need, a bank can better service the customer by offering a product close to that need. For details, see the server automation script "[FTOS_BARET_FilterAvailableProductsAmountAndPeriod](#)" on [page 148](#).

Additionally, some fields are dynamic in this journey and they depend on the choice made here. By offering to get to know the need of the customer, the bank is prepared to aid the user.

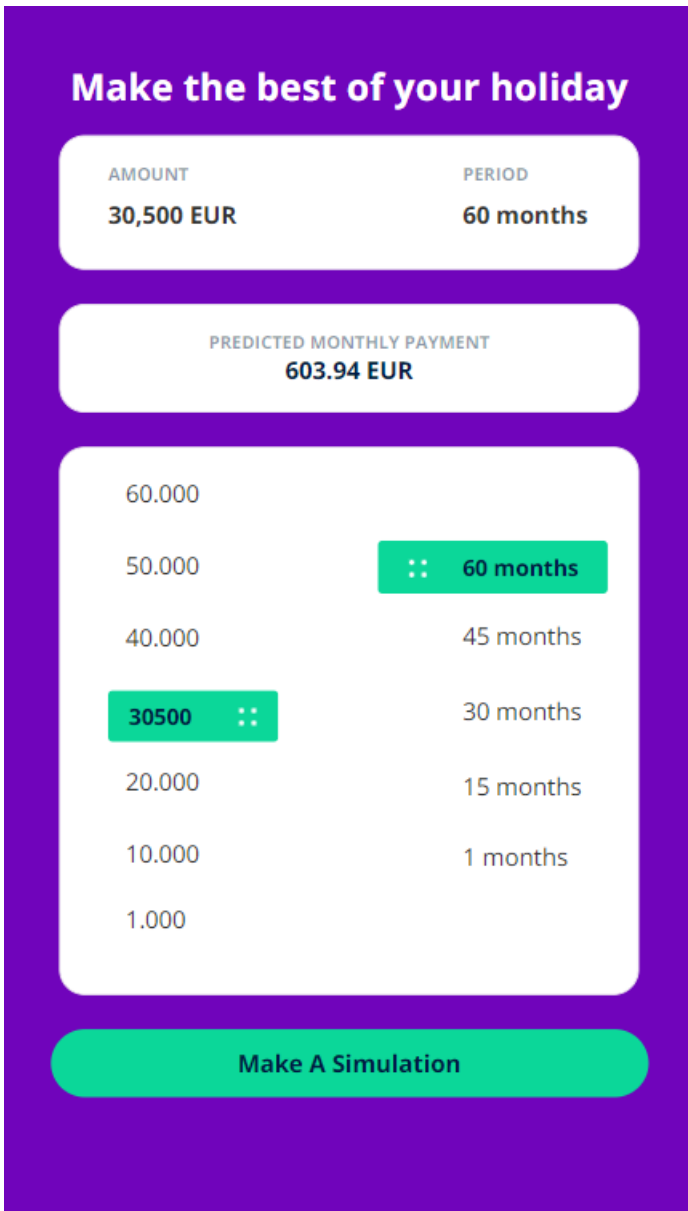
For this flow 5 loans have been configured. Each serves a need from the list above and the selection from the list triggers the display of a product or another.

NOTE

For details on how it was configured, see "[Configuring the Banking Products](#)" on [page 99](#).

Simulation

In this screen, the potential customer inputs two parameters: the amount and the period of the loan. Based on these values, the system recommends a product. The simulation gives the customer a preview to a product that might service their financial needs. The potential customer must:



1. Insert the values in the two fields labeled **Amount** and **Period**. The amount is the value borrowed from the bank and the period is the interval of time when the person is expected to pay off the amount borrowed with an interest. The period is measured in months.
2. Click the backspace button to delete the default amounts.
3. Insert the values needed.

or

1. Insert loan details such as **amount** and **period**. The amount is the value borrowed from the bank and the period is the interval of time when the person will be paying back the amount borrowed with an interest.
2. Use the two vertical scrolls to set the amount and period.
3. Click **Make a simulation**, to continue to ["Product Selection" on the next page](#).

The system now calculates the input values to return a suggestion to the customer. In FintechOS Studio, the values inputted by the customer are registered, afterwards the system calls for the maximum and minimum amounts and periods for each banking product. For details, see the server automation script ["FTOS_BARET_FilterAvailableProductsAmountAndPeriod"](#) on page 148. Depending on the values inserted, the system checks to see whether the values are found within the minimum and maximum. Then, it lists the top 3 (or less depending on the result) based on the order in the naming of the products.

NOTE

For more details on how the values were configured in the slider, see ["FTOS_BARET_GetSlidersParameters"](#) on page 154.

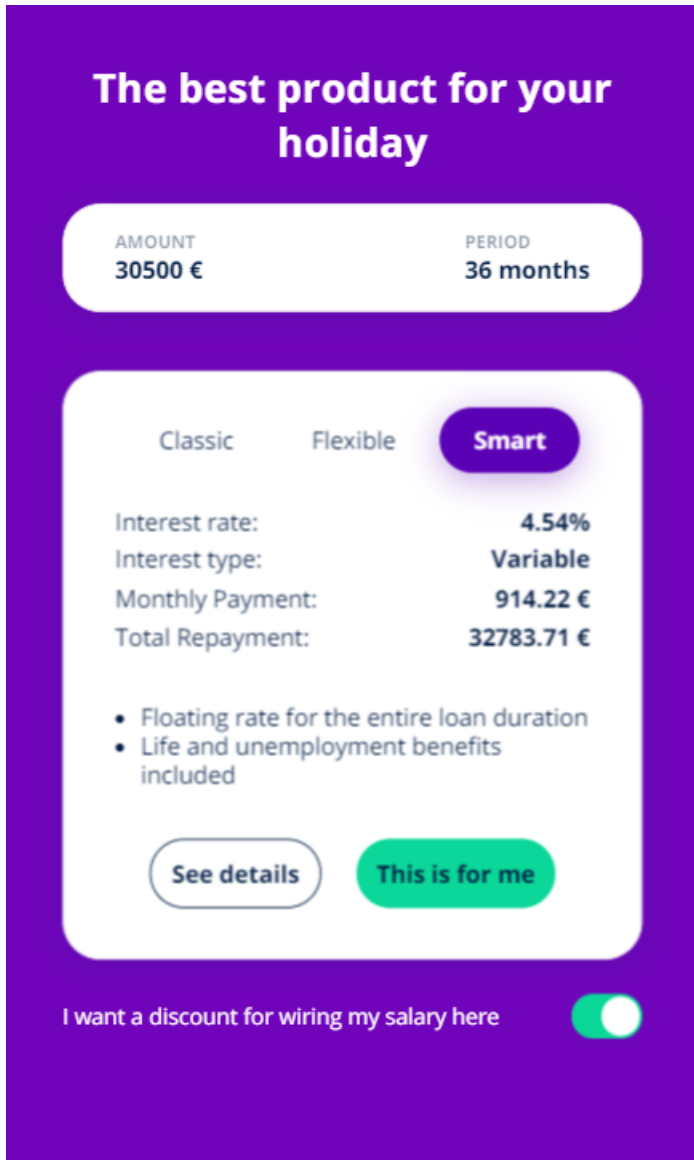
Product Selection

In this step, the applicant is prompted with an array of maximum three products to choose from depending on their needs. The products were configured using "[Configuring the Banking Products](#)" on page 99 and they can be modified as needed to fit the product selection of any bank. From the list of five products existing in the solution, only three products are displayed to the customer depending on the values selected previously: amount and period.

HINT

To change the maximum number of displayed products, navigate to the form FTOS_BARET_LoanSimulation, step Simulation > Advanced > After Events and in the code change the property `maxProductsDisplayed` from 3 to the needed number in the array params.

The applicant is presented with three loans. Each loan has its information displayed on a graphic card. The first product displayed is the recommendation made by the system based on what was inserted by the customer in the screen before, "[Simulation](#)" on page 15.



The middle section displays the products available. By clicking on the name, it highlights from white to purple and it displays a short presentation:

- interest rate
- interest type
- monthly payment

- total payment
- benefits.

Two buttons are available for each product:

- **This is for me.**

Click this button to select this product loan.

- **See details.**

Click this button to open the Details page.

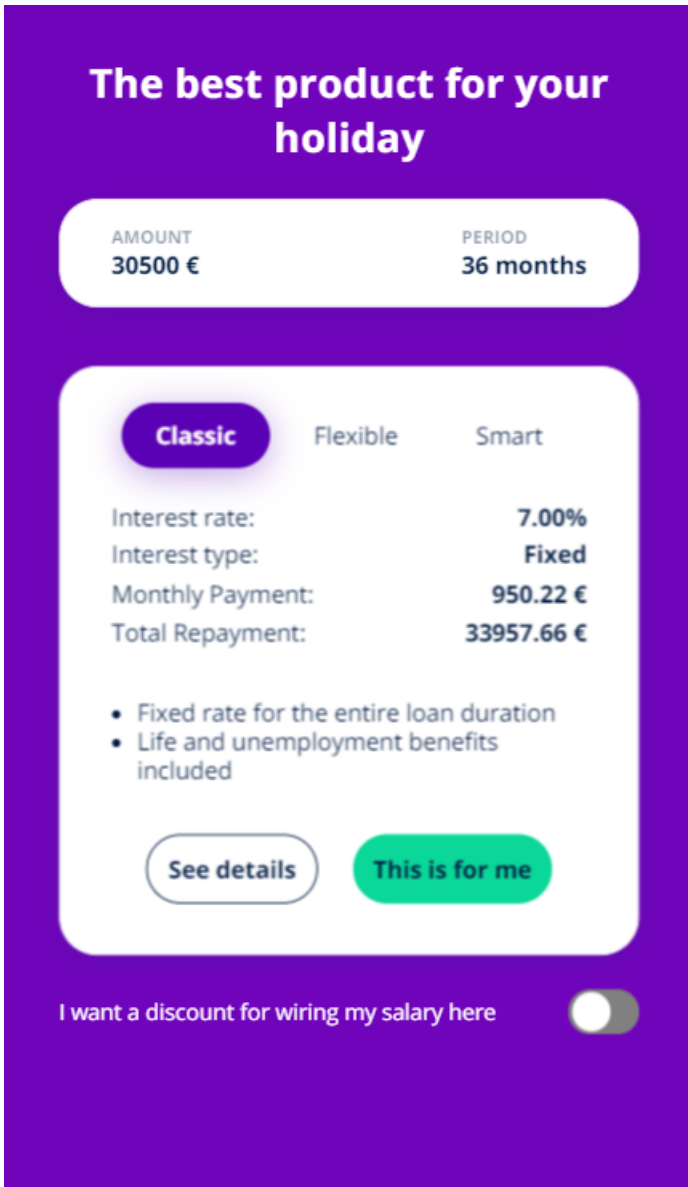
By toggling the **I want to wire my salary here**, a discount is applied. See "[Configuring the Banking Products](#)" on page 99 for details on discounts.

Banking Product	Value of the Discount
Smart	1.5
Savvy	1
Basic	2
Flexible	1
Classic	1

HINT

To change the discount, access the Banking Product Factory > Banking Product Dimensions > Discounts > Discounts List, select **Income Receiving Variable Interest** or/ and **Income Receiving**.

To see more details about each product, click **See details** and the **Details** page is displayed. The additional page loads with the following information:



- Monthly installment

The sum of money paid each month by the customer to the lender at a specified date each calendar month. It contains the interest and a portion of the principal.

- Interest percent

The interest rate is the amount a lender charges a borrower and is a percentage of the principal.

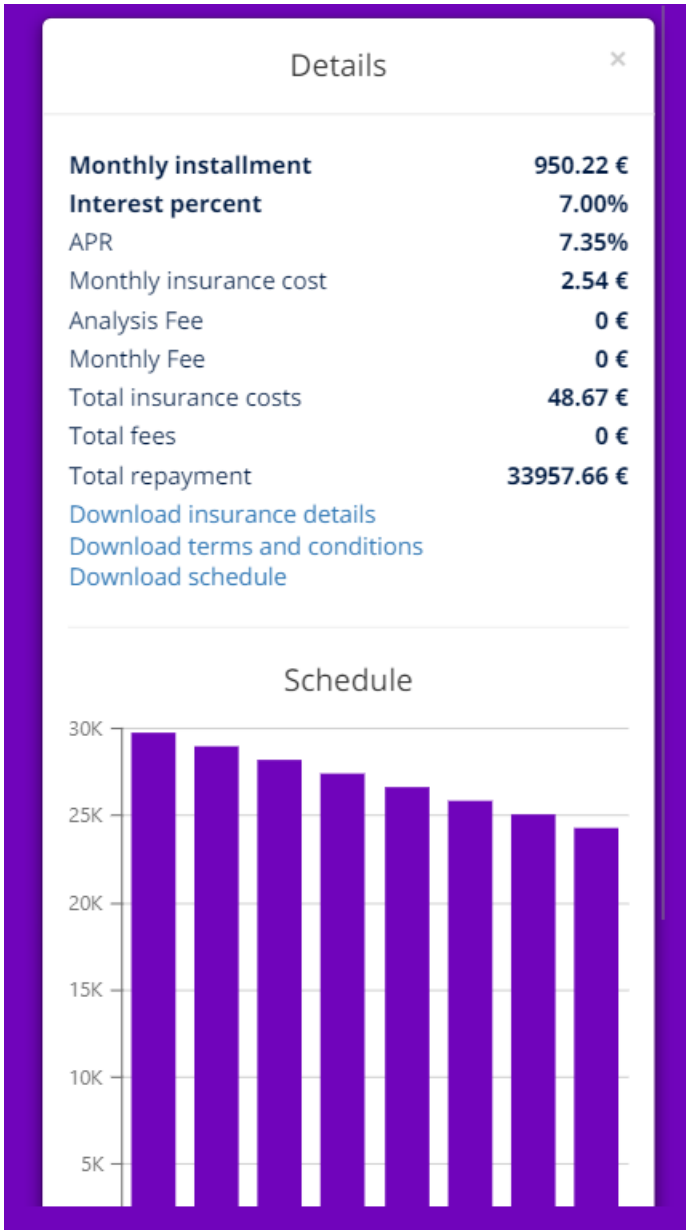
- APR
It represents the cost a borrower pay each year to borrow a sum of money, including fees. It is expressed as a percentage.
- Monthly insurance cost
The price of the insurance paid monthly.
- Analysis Fee
The price for the analysis of the application.
- Monthly Fee
The price paid monthly.
- Total insurance costs
The price of the insurance.
- Total fees
The total price of the aggregated fees charged by the lender.
- Total repayment
The value of money the borrower has to give to the lender.
- a chart with the number of payments and the value left to pay after each installment.

In the **Details** page, there are three options available to read more about the loan:

- Download terms and conditions
This hyperlink automatically triggers the download on the local drive of the pdf with information about the terms & conditions of the loan.
- Download schedule.
This hyperlink automatically triggers the download on the local drive of the pdf with the information about the reimbursement of the loan: installment numbers, remaining value, interest principal, administration fee, analysis fee, life insurance, total installment.
- Download insurance details (applicable only for the banking product "[1 Classic](#)" on [page 100](#)).

This hyperlink automatically triggers the download on the local drive of the pdf with information about the loan.

From the **See details** page, there are the options to select the product by clicking **This is for me** or to return to the product selection by clicking **Close window**.



From the main product page, click on **This is for me** to select a product and continue to "Contact Info" on the next page.

Contact Info

The applicant is asked to insert their phone number and email address to send them two codes to verify the two contact addresses declared.

The following fields are displayed:

Step 1 of 5

Contact info

Please provide your available email and phone number.

First Name
Anna

Last Name
Smith

Phone
+334564537

Email
ana.smith@mail.com

I have read and agree to the terms & conditions and privacy notice.

We may contact you about products and services you may like.

Next

Field	Description
First Name	Insert your first name.
Last Name	Insert your surname.
Email	Insert your email address.
Phone Number	Insert your phone number. You can insert the number without a country code for Romanian numbers.

Two consents are presented to the customer: Terms& conditions & privacy (mandatory) and Marketing (optional) consents. Toggle them as needed.

Click **Next** to continue the process.

For details on how this was configured, see "[Configuring the Digital Flow Settings](#)" on page 125.

Insert codes

As instructed, insert the two codes which have been sent automatically by the system.

Step 1 of 5

Validations

Insert the two codes you have received on your email and phone number.

SMS Code

55 s

Email Code

115 s

Swipe right to edit your phone number or email.

To validate the code, be it SMS or email, simply insert it and click outside of the text-box. The timer stops and displays *Validated* or *Resend* and in () brackets the number or attempts left. Click **Resend** to generate the code again.

When you reach the maximum attempts, the system displays a toast message.

Step 1 of 5

Validations

Insert the two codes you have received on your email and phone number.

SMS Code

2345

Resend(2)

Email Code

4567

Resend(2)

Swipe right to edit your phone number or email.

There are 60 seconds available for count-down when the user can insert the SMS code and 120 seconds for the email code. A customer can retry 5 times to insert the codes.

NOTE

For details on the process, see "[Configuring the Digital Flow Settings](#)" on page 125. Using settings for the OTP, codes with 4 digits are generated, and the system records the pending, validated and failed statuses of the confirmation of the channel: email and SMS in the entity FTOS_DFP_OTP.

Swipe right to change email or phone number in case the codes were sent to the wrong address or phone number.

Click **Next** to continue to the page "[Know Your Customer](#)" on the next page.

Know Your Customer

Once the codes have been successfully inserted into the system and the email and phone number confirmed, the user can move to the next step where they give information about their identity. The data is collected in multiple ways allowing the user to choose the method. The data is collected from a document or Open Banking to ensure that the user is part of the right audience with a valid citizenship. The data collected is mandatory due to regulatory laws for contracting a loan or any financial product.

The screen displays the following list of options between which the user must choose:

- Scan ID (it is the recommended option by the system. It can scan a personal identification card, driver's license and passport. See "[Computer Vision & Face recognition & Liveness](#)" on page 129 for details.)
- Use Open Banking (allow the system to pull data from another bank where the potential customer has an account opened.)
- Use NFC (it allows the potential customer to use Near Field Communication by approaching their ID card to the phone).

From the list, the user must select one of the three options offered by FintechOS Portal.

Step 2 of 5

Proof of Identity

Which of the following options do you wish to collect information?



Scan my ID

Or

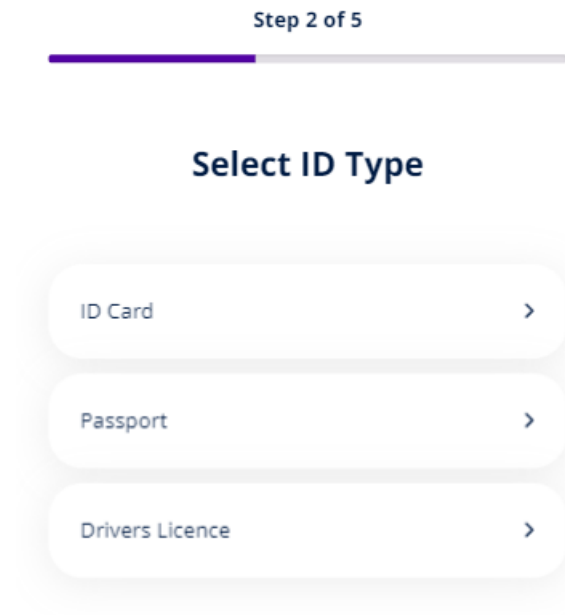
Use NFC



Transfer your information from another bank



Scanning an Identity Document



The supported ID documents are:

- national identity card
- passport
- driver's license (for United Kingdom citizens only)

Mobile Mode Flow

1. Click **Take a photo**.

Submit identity card (front)



Take a photo of the front of your card

Take photo

 onfido | Real Identity

2. Click **Confirm**.



Check your image



Make sure your card details are clear to read,
with no blur or glare

Redo

Confirm

3. Click **Take photo** to take a photo of the back of your ID card.



Submit identity card (back)



Take a photo of the back of your card

Take photo



4. Click **Confirm**.



Check your image



Make sure your card details are clear to read,
with no blur or glare

Redo

Confirm

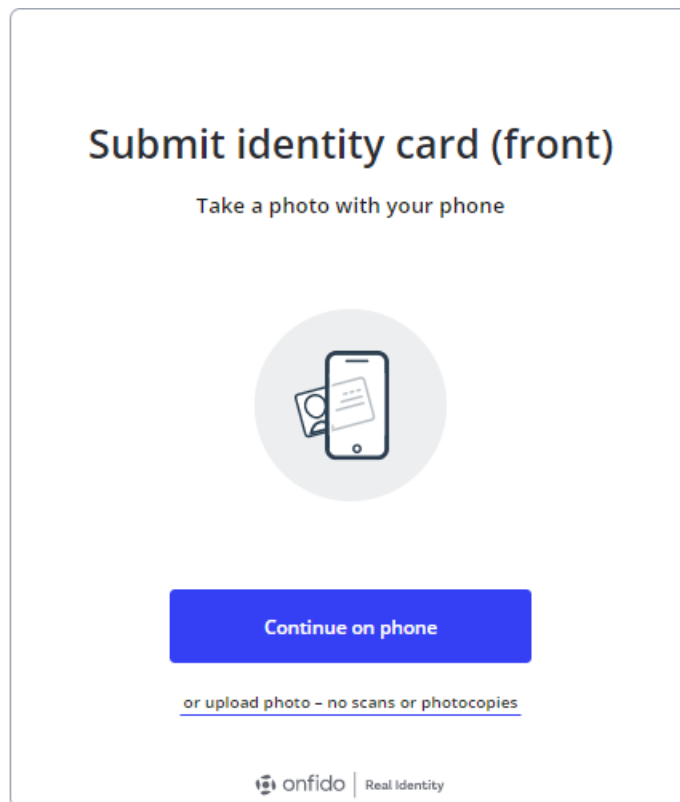
 onfido | Real Identity

NOTE

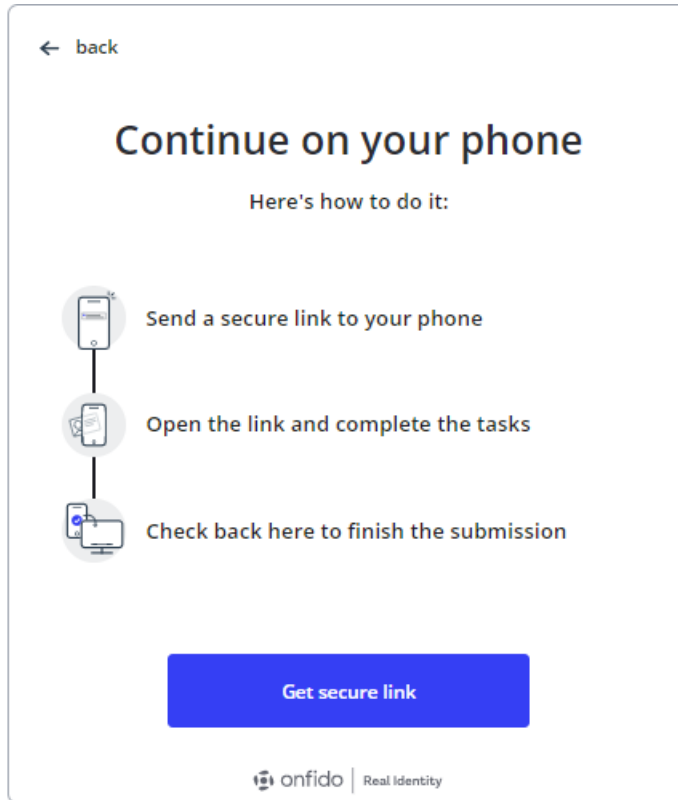
To read how it was configured, see ["Configuring the Digital Flow Settings"](#) on page 125.

Desktop Mode Flow

1. Two options are given to the customer: **Continue on phone** or **upload a photo**. Click **Continue on phone**. If you choose to upload a photo, the flow is the same as the flow described in "Mobile Mode Flow" on page 30.

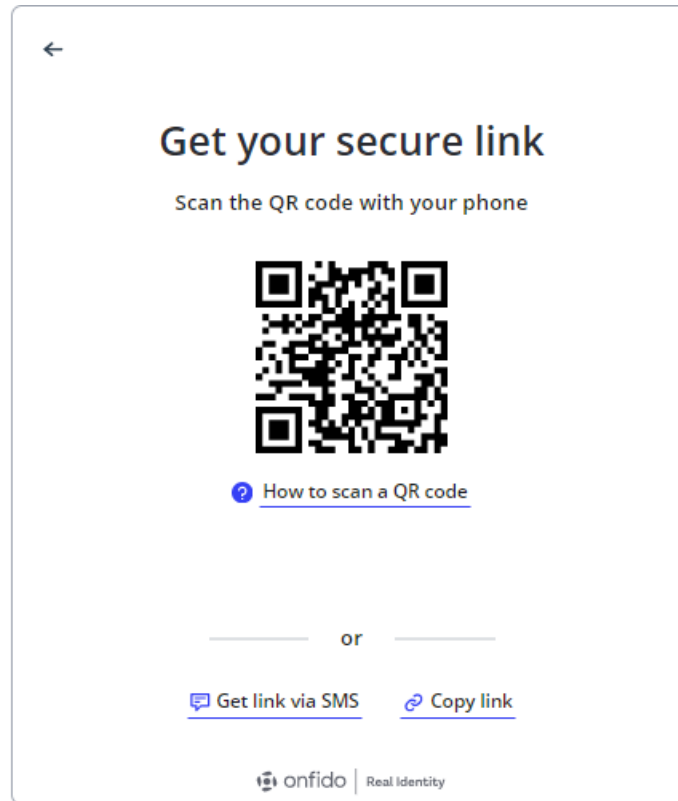


2. Click **Get secure link**.



3. Click **Get secure link** to get a **QR code**¹. Scan the code using your camera lens or get the link on your phone (click **Get link via SMS**) or copy the link and sent it to your phone however you wish (click **Copy Link**).

¹A QR code (abbreviated from Quick Response code) is a type of matrix barcode (or two-dimensional barcode).



- If you scanned the QR code, on your phone you are redirected to the website link where you are invited to take a photo of your ID. The flow is the same as the flow described above in "Mobile Mode Flow" on page 30.



Check your image



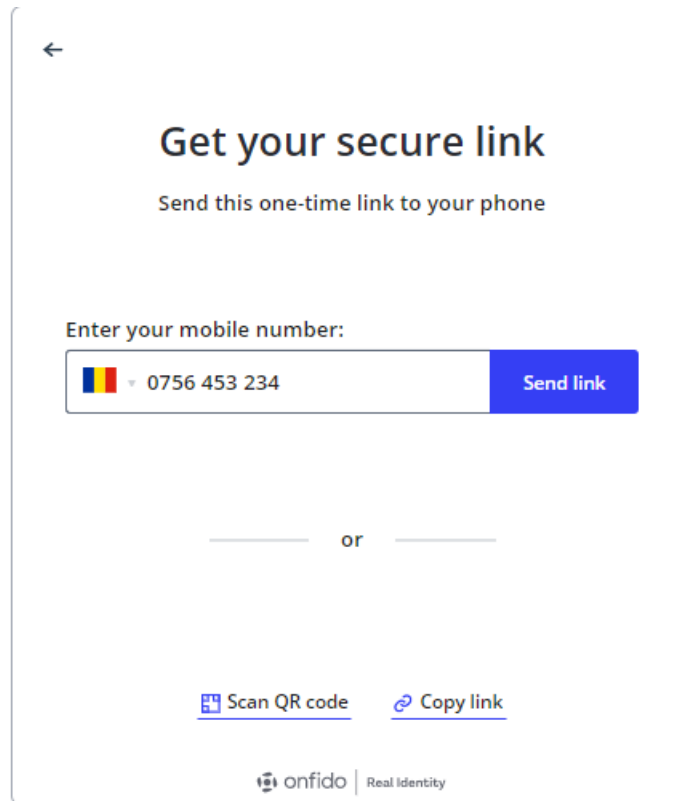
Make sure your card details are clear to read,
with no blur or glare

Redo

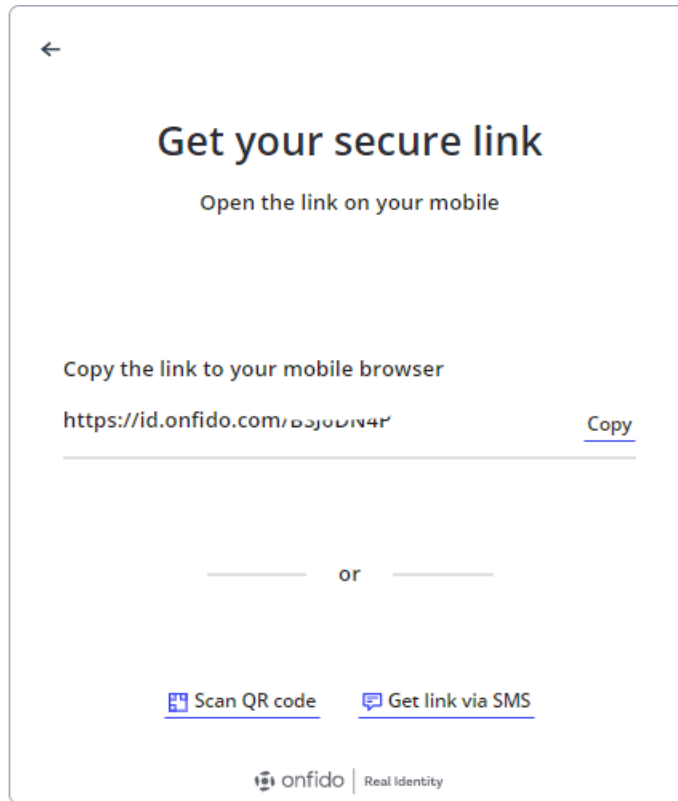
Confirm



- If you selected the send SMS, you are asked to insert your phone number where the link will be sent. Select the country from the drop-down, insert the number and click **Send link**. From the SMS, click on the link to open it or copy & paste it into the browser of your choice. The flow is the same as the flow described above in ["Mobile Mode Flow"](#) on page 30.



- If you selected the get link, the screen displays the link and you can click on **Copy** and then use it as needed. The flow is the same as the flow described above in "Mobile Mode Flow" on page 30.



Open Banking

FintechOS is able to pull data from an external database (another commercial bank where the customer has an account opened). This is possible through the legal framework of the Payment Services Directive 2. It's an European Union directive designed to regulate better payments services.

IMPORTANT!

There are no configurations in place for this type of gathering of data. It can be developed by banks according to their needs.

Insert your **IBAN**¹. Click **Next** to continue.

¹International Bank Account Number

Step 2 of 5

Insert your IBAN

IBAN Number

Next

NFC

Near field communication transmits data through electromagnetic radio fields to enable two devices to communicate with each other. Approach your ID card to the phone with the NFC toggled **On**. Hold the ID touching the phone a few second. Click **Next** to continue.

IMPORTANT!

There are no configurations in place for this type of gathering of data. It can be developed by banks according to their needs.



Check Data Collected

The potential borrower has given the following information using one of the three methods available (scan ID, use NFC and Open Banking). If it was collected wrongly, they can edit the following fields, which are already completed with the data collected earlier:

1 Personal information

Step 2 of 5

Personal Info

Please check the data collected. If mistaken, edit the field.

First Name

Anna

Last Name

Smith

Personal Identification Number

XXXXXXXXXXXX

Date Of Birth

13.08.1982



Nationality

ROU



Place Of Birth

Hunedoara

Next

Field	Data Type	Description
First Name	Text	Edit your first name.

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Field	Data Type	Description
Last Name	Text	Edit your last name.
Personal Identification Number	Text	Edit your Personal Identification Number.
Date Of Birth	Invariant Date	Select your birthday.
Nationality	Lookup	Select your nationality.
Citizenship	Lookup	Select your citizenship.
Place Of Birth	Lookup	Edit your place of birth.
Id Card Series	Text	Edit your ID card series.
Id Card Number	Text	Edit your ID card number.
Id Issue Date	Invariant Date	Edit your ID issue date.
Id Expiration Date	Invariant Date	Edit your ID expiration date.
Id Issue Institution	Text	Edit your ID issue institution.
Validity		Edit your ID validity.

Click **Next** to open the ID card information.

2 ID card information

Step 2 of 5

ID Info

Please verify or complete your data.

Id Card Series

TR

Id Card Number

479935

Id Issue Date

20.08.2013



Id Expiration Date

13.08.2023



Id Issue Institution

SPCLEP Alexandria

Next

Field	Data Type	Description
ID issue date	Text	Edit the date when the document was released.
ID series	Text	Edit the number of the document.
ID expiration date	Text	Edit the date from which the document will no longer be valid.
Institution who issued the ID	Text	Edit the institution who created the ID.

Click **Next** to open the Address information.

3 Address information

Step 2 of 5

Your Address

Please verify or complete your data.

Street	Aviatorilor
Street Number	101
Apartment	101A
Floor	10
City	Bucharest
Country	Romania
District	Bucharest
Building Number	110A
Postal Code	100243

Next

Field	Data Type	Description
Country	Lookup	Select your country.
District	Lookup	Select your district.
City	Lookup	Select your city.
Street	Text	Edit your street name.
Street No	Whole Number	Edit street number.
Building No	Text	Edit the building number.
Floor No	Whole Number	Edit floor number.
Apartment No	Whole Number	Edit apartment number.
Postal Code	Whole Number	Edit postal code.
Stairway	Text	Edit stairway.

Click **Next** to continue to the page ["Video Recording"](#) on the next page.

Video Recording

If the data was inserted successfully in the system in the previous step, the potential customer can access the video recording part of the session. This step has the following phases:



- face recognition
- liveness
- speech.

The page entitled *Video Recording* is displayed with the following message:

1. Click **Continue**.



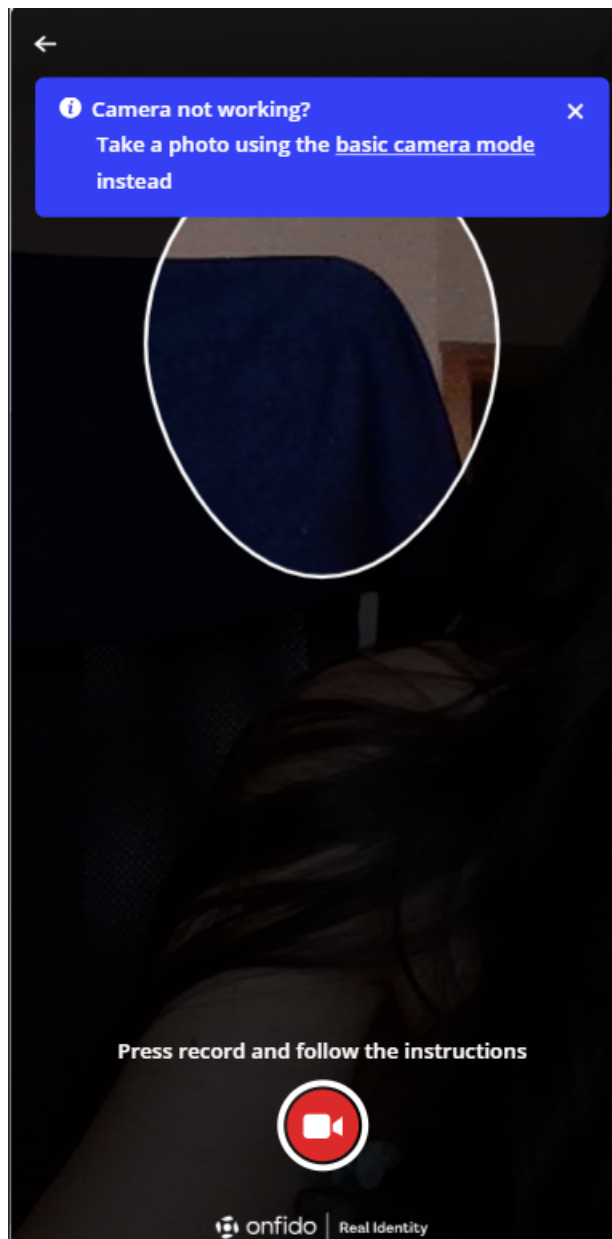
Let's make sure nobody's impersonating you

-  We'll ask you to film yourself performing 2 simple actions
-  One will involve speaking out loud

Continue



2. Click on the red camera icon to start.



3. The processor displays instructions to be performed, including moving your head to confirm you are a live person, not a photograph. The result is matched with the photograph from the identity document from the database.

The video recording is necessary for the customer to progress in the application. If this step is failed the business status is changed to Rejected–FaceRecognition as presented in "[Configuring the Business Workflows Processor](#)" on page 83.

The user has 5 possibilities to retry should the video recording fail.

NOTE

To configure the recording, see "[Computer Vision & Face recognition & Liveness](#)" on page 129.

Consents

Once the video recording is successfully passed, the potential customer can navigate to the Consents page. It displays the following three documents:

- National Agency for Fiscal Administration Consent
- Credit Bureau Consent
- Terms & Conditions.

Step 3 of 5

Consents

Please agree to collect some financial information about you for the following third-parties:

- I have read the terms and conditions
- National Taxation Institute
- Credit Bureau

Next

From this page, it is possible to read the documents by clicking the name and the accessing the documents downloaded locally on the device. Each document is presented by the bank to the customer for approval.

NOTE

Depending on the national framework and policies in place, the list of documents may vary. To see how to generate a document, see ["Configuring the Documents" on page 124.](#)

To agree to the document, click **Yes**. If the potential customer does not agree to one of the following documents, then the flow ends here and they cannot proceed.

Some Lifestyle Questions

This step collects the scoring and eligibility data to determine whether or not a user can contract the requested amount. The scoring formula is paramount as it takes into account the data collected here (Age; Marital Status; Employment Status).

The user must fill in the following fields:

Step 4 of 5

Some lifestyle questions

Marital status

Occupation

Education Level

Family Members

Residence type

Residence Seniority ●

Other properties

[Next](#)

Field	Description
Marital Status	<p>This field is mandatory. Choose between:</p> <ul style="list-style-type: none"> • Married • Consensual union • Not married.
Occupation	<p>This field is mandatory. One of the available options must be selected:</p> <ul style="list-style-type: none"> • Employed • Retired • Freelancer • Inactive.
Education level	<p>One of the available options must be selected:</p> <ul style="list-style-type: none"> • Postgraduate Studies (MBA, MA, ACCA, CFA, etc.) • Gymnasium Studies • Vocational School • No Studies/Primary School • Higher Education • High School.
Family members	<p>Insert a whole number.</p>
Residence type	<p>Select from the list:</p> <ul style="list-style-type: none"> • rented • owned • other.

Field	Description
Residence seniority	Select from the list: <ul style="list-style-type: none"> • Less than one year • Between one and five years • More than five years.

Toggle **Other properties** to declare the houses you own.

Click **Next** to continue to the page "[Submit Application](#)" below.

NOTE

To see and modify the calculation for the scoring and eligibility, see "[Configuring the Business Formulas](#)" on page 92.

Submit Application

After the data for eligibility and scoring was added and the "[Configuring the Business Formulas](#)" on page 92 automation processor approved the potential customer, they can send the loan application to be reviewed. During this time the databases from ANAF and Credit Bureau are queried by FintechOS Studio using server-side scripts presented in "[ANAF & Credit Bureau Integration](#)" on page 157. The final result is equal to the FICO SCORE plus the application score.

IMPORTANT!

FICO score is set at 720, hence all loans are approved. Change it in the data sets to fit the business needs.

Step 5 of 5

Good job reaching this point

Your loan request had been configured successfully. It's time to submit your application for review and get the final offer you need.

Please review your application before submitting it ↗

OR

Submit loan request

Click **Please review application** to see the product selected.

Step 5 of 5

Good job reaching this point

Your loan request had been configured successfully. It's time to submit your application for review and get the final offer you need.

Please review your application before submitting it ↴

Product	Smart
Amount	30500 EUR
Period	36 months
Monthly payment	936.07 EUR
APR	6.44 %

Submit loan request

Click **Submit loan request** to sent it.

This page lets the user know that they have to wait a bit for the answer from those databases to be retrieved. An email with a continuation link is sent to the email address inserted in the first step, "[Contact Info](#)" on page 23.

The status of the application becomes SubmittedForReview. See "[Configuring the Business Workflows Processor](#)" on page 83 for details.

At this time, the **ANAF**¹ and **Credit Bureau**² are interrogated.

¹Agenția Națională de Administrare Fiscală (ANAF) It is the specialized body of the central public administration in Romania. It has its own legal persona, by detaching the directions with attributions in the administration of the state revenues within the Ministry of Public Finance. It ensures the resources for the public expenses of the state by collecting and administering effectively and efficiently the taxes, taxes, contributions and other amounts due to the general consolidated budget.

²The Credit Bureau aims to support the participants in the system by providing real, up-to-date and consistent information regarding individuals who have taken loans from banks or financial companies, purchased a product under a leasing system or have been insured against the risk of non-payment by an insurance company.

NOTE

At this stage of development, the integration is just simulated. It is not up and running accordingly. The income of the potential customer is generated randomly each time.

For details on how they were configured, see ["ANAF & Credit Bureau Integration"](#) on page 157.

This might take a few minutes

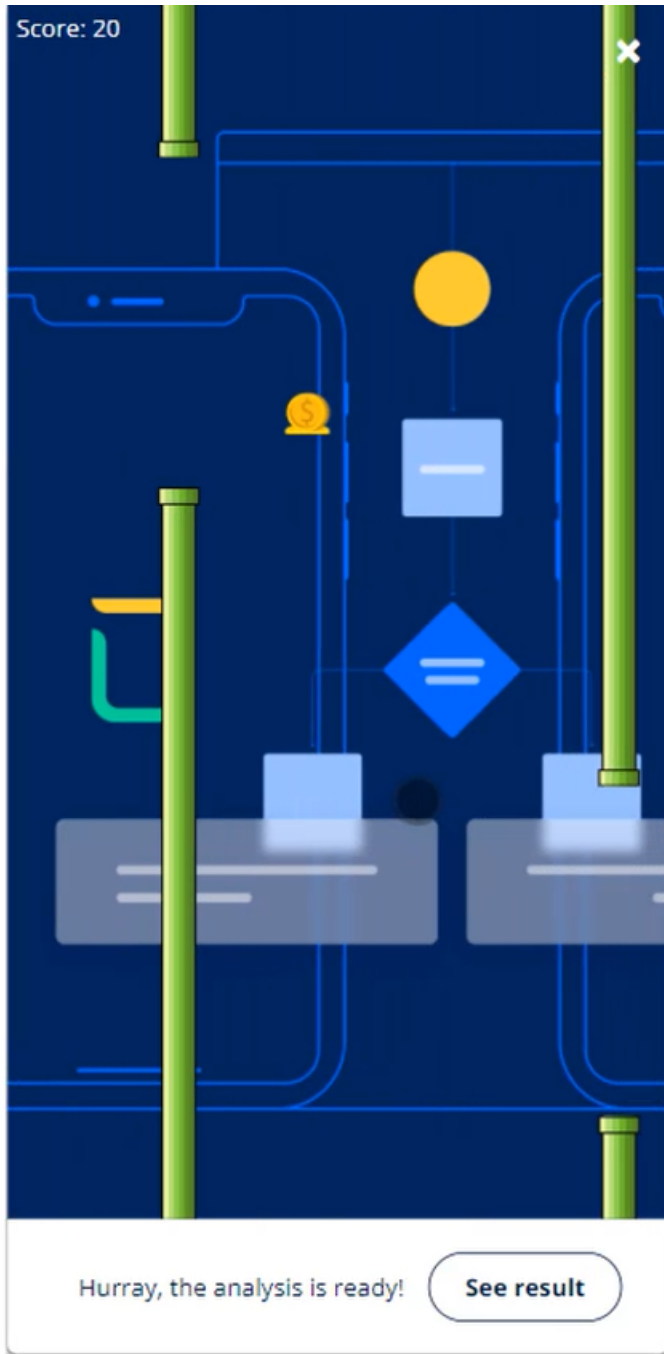
Do you want to play a game during this time?

Play now

Hurray, the analysis is ready!

See result

If the user prefers, they can play a game to pass the time and not exit the application screen. During the game, a message pops up to let the user know that the query is done and they can return to the application. At any time during the game, it is possible to exit safely.



When the analysis is done, the application moves into one of the two statuses: `ApplicationApproved` or `Rejected-FinancialAnalysis`. If the application is approved by the bank, the customer moves to the next step, "[Application Result](#)" on the next page.

Application Result

After the query of National Agency for Fiscal Administration and Credit Bureau is done, a page with the response to the initial application done by the customer is displayed. At this stage, an email is sent informing the customer that the loan was approved/ denied as explained in "[Email&SMS Generation](#)" on page 138.

IMPORTANT!

The integrations are simulated. The income is generated randomly, and the active loans are set to one with the use of server-side scripts. The [Data Model](#) and the endpoints are configured already for such an integration. For more details, see "[ANAF & Credit Bureau Integration](#)" on page 157 and the script "[FTOS_BARET_FinancialCalculations](#)" on page 152.

Depending on the outcome (eligibility, scoring, income, **DTI**¹), several new offers are available to the user to choose from, among which:

¹The Debt-to-Income ratio (DTI) is a personal indicator of a good balance between debt and income. Monthly debt payment amount / Monthly gross amount (before taxes and other deductions).

Hurray! Your loan has been approved

At the same time, we have tailored some options for you

The card displays loan details in two sections. The top section shows 'AMOUNT 30500 €' and 'PERIOD 36 months'. The bottom section is titled 'Requested Offer' and contains a table with loan terms.

Requested Offer	Max Offer	Max Amount	Max Period
Interest rate:			6.04%
Interest type:			Variable
Monthly Payment:			936.07 €
Total Repayment:			33526.75 €

Floating rate with life and unemployment benefits

Buttons: [See details](#) and [This is for me](#)

- maximum amount with maximum tenor
This product offers the maximum amount of money and the maximum period for reimbursement the customer can take on.
- requested amount with maximum tenor
This product offers the amount of money the customer asked for with the maximum period for reimbursement the customer can take on.

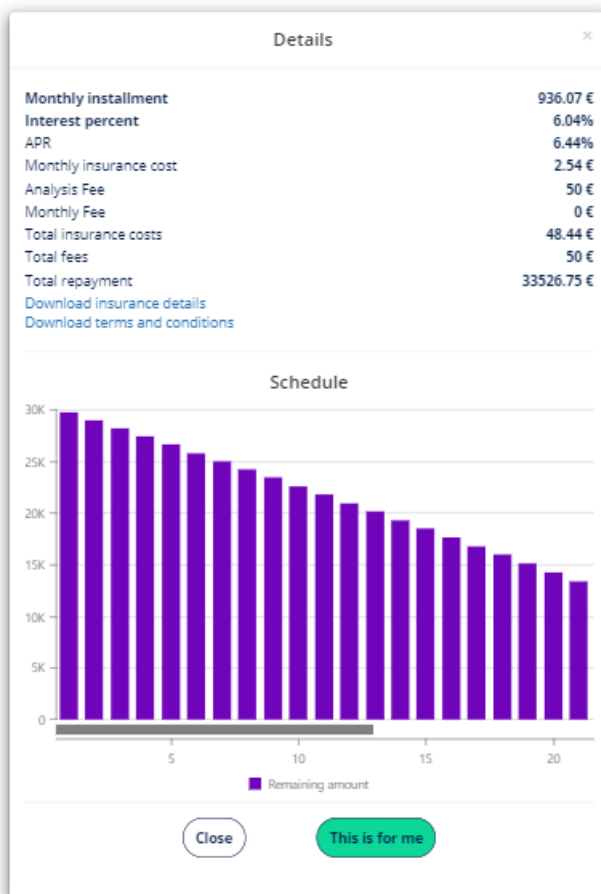
- maximum amount with request tenor

This product offers the maximum amount of money the customer can take on and the period selected by the customer.

- lower amount.

Sadly, the customer qualifies financially for an amount lower than expected.

Each product has two buttons: **See details** and **This is for me**. To see the scheduler for each, click **See details**.



- Monthly installment

The sum of money paid each month by the customer to the lender at a specified date each calendar month. It contains the interest and a portion of the principal.

- Interest percent

The interest rate is the amount a lender charges a borrower and is a percentage of the principal.

- APR

It represents the cost a borrower pay each year to borrow a sum of money, including fees. It is expressed as a percentage.

- Monthly insurance cost

The price of the insurance paid monthly.

- Analysis Fee

The price for the analysis of the application.

- Monthly Fee

The price paid monthly.

- Total insurance costs

The price of the insurance.

- Total fees

The total price of the aggregated fees charged by the lender.

- Total repayment

The value of money the borrower has to give to the lender.

- a chart with the number of payments and the value left to pay after each installment.

In the **Details** page, there are three options available to read more about the loan:

- Download terms and conditions

This hyperlink automatically triggers the download on the local drive of the pdf with information about the terms & conditions of the loan.

- Download schedule.

This hyperlink automatically triggers the download on the local drive of the pdf with the information about the reimbursement of the loan: installment numbers, remaining value, interest principal, administration fee, analysis fee, life insurance, total installment.

- Download insurance details (applicable only for the banking product "[1 Classic](#)" on [page 100](#)).

This hyperlink automatically triggers the download on the local drive of the pdf with information about the loan.

To select the final offer, click **This is for me** and continue to the next step, "[Choose Installment Payment Date](#)" below.

To return to the page with offers, click **Close**.

NOTE

To read more on how it was configured, see "[Configuring the Business Formulas](#)" on [page 92](#).

Choose Installment Payment Date

Select from the drop-down the date when to pay the installment monthly. The system automatically picks the 5th of each month if the customer makes no selection.

Choose the installment payment date

It might be helpful to consider choosing the day after you receive your salary each month.

Pick a day

OR

Click 'Next' and we will set you the default date for payments on 5th of every month.

Next

NOTE

For more details, see "[FTOS_BARET_SetPaymentDay](#)" on page 149.

Click **Next** to continue to the step.

After clicking **Next**, an endpoint is called to check if the applicant is eligible for a credit card, based on the available **DTI**¹. If the borrower is eligible for a credit card, the next step is "[Credit Card](#)" below.

If the borrower is not eligible for such a product, the next step is "[Signature of Documents](#)" on page 67.

Credit Card

Depending on the financial state of the customer, they may be eligible for a credit card. If so, then the page with credit card offers are displayed. Each bank has its own maximum value for the **DTI**². Based on the maxDTI and the customers's DTI, the system calculates the **Available DTI**³ of each borrower. It represents a percentage of the maxCreditCardLimit that the applicant could take on (it is set to 3%). Based on this a calculation is done for the Credit Card Limit. Then, filtering all the available credit cards defined in "[Configuring the Banking Products](#)" on page 99 (where creditCardLimit >= min Amount of the credit card product). The max limit of the slider will then be the minimum of (Credit Card Limit calculated and max Amount of the credit card product itself).

Two credit card options are available as configured in "[Configuring the Banking Products](#)" on page 99:

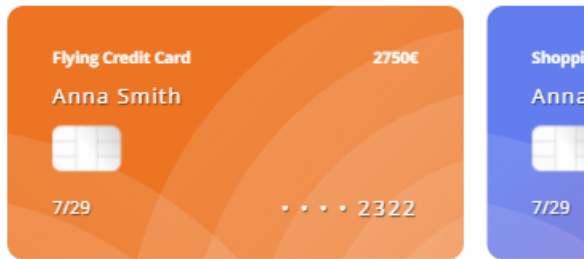
¹The Debt-to-Income ratio (DTI) is a personal indicator of a good balance between debt and income. Monthly debt payment amount / Monthly gross amount (before taxes and other deductions).

²The Debt-to-Income ratio (DTI) is a personal indicator of a good balance between debt and income. Monthly debt payment amount / Monthly gross amount (before taxes and other deductions).

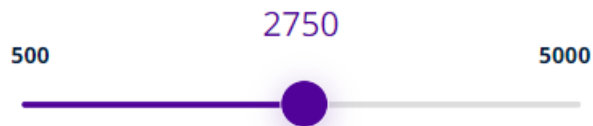
³It represents the additional monthly payment that the applicant could pay, until the borrower reach the maxDTI defined at a bank level.

Credit card proposal

You are also eligible for a credit card.



- 4 Upgraded Boardings a year
- 9,000 points on each cardmember anniversary



I have read the terms and conditions

I want this card

I don't want any cards

- an initial amount
- maximum amount

It holds the maximum amount a customer can take on according to the **DTI**¹ calculations.

Tick the boolean **Terms & Conditions**, if you agree to the stipulations of the document. To select one of the cards, click **I want this card**.

Use the slider to modify the amount. It has two ends with a minimum value of 500 and a maximum of 5000.

Click **I don't want any card** to move to the next step "Signature of Documents" below without a card.

To select a card, click on **I want this card**.

NOTE

To read more about the formulas used to calculate the availability of a credit card, see "[Configuring the Business Formulas](#)" on page 92.

Signature of Documents

After the final offer was selected, then the user can preview the documents for the loan they are acquiring. An email is sent with the paperwork allowing the customer to read at leisure the loan contract, current account contract, **FEIS**² and, optionally, the insurance contract.

¹The Debt-to-Income ratio (DTI) is a personal indicator of a good balance between debt and income. Monthly debt payment amount / Monthly gross amount (before taxes and other deductions).

²The European Fund for Strategic Investment (EFSI) is an initiative launched jointly by the European Investment Bank Group – the European Investment Bank and European Investment Fund and the European Commission to help overcome the current investment gap in the EU. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around the continent to ensure that money reaches the real economy.

The first screen labeled **Preview the documents** has all the documents displayed. To view any one of the documents, click on the pdf symbol at the beginning of each row. An email with the documents has been sent as well to allow the user to take their time to read them carefully.

An email is sent with the documents to be read. For details on how the email is configured, see "[Email&SMS Generation](#)" on [page 138](#).

To move to the next step, click **Sign all documents**. The signature is done 100% digitally.

IMPORTANT!

The signature is simulated. An one-time-password is generated.

The customer must:

MOBILE RETAIL LOAN ORIGINATION USER GUIDE

1. Read the contract and agree with the terms.
2. Toggle each document.

And now the paperwork

Via your email address, we have sent you the documents for our services:

	I AGREE
Loan Contract	<input checked="" type="checkbox"/>
Current Account Contract	<input checked="" type="checkbox"/>
FEIS	<input checked="" type="checkbox"/>
Insurance Policy	<input checked="" type="checkbox"/>

Please, consult them and take your time.
When you are ready, you can electronically sign them using the button below

Sign all documents and receive the cash

The email has as well a link from where you can resume the application later on and sign the documents

3. Click **Sign all documents and receive the cash.**

Please, insert code

It was sent to you via SMS.

SMS Code

7284

36 s

4. Insert the One-Time-Password inserted from the SMS received.
If it is inserted wrongly, the system asks to click on **Send a new PIN.**
5. The documents have been successfully signed. An email is sent with the documents signed as explained in ["Email" on page 138.](#)

The contracts have been signed!



30,500 EUR

Are now in your account

All the documents that you have signed have been resent to your email with the signature. Please keep them safely

Get started with Internet/ Mobile Banking where you will access the funds.

Before you go, give this experience a rating to help us improve for your next visit.

Give us a review

Skip review

NOTE

To see how it was configured, click on "Configuring the Documents" on page 124 & "Configuring the Digital Flow Settings" on page 125.

Congratulations & Feedback

After the signature of the documents, the user arrives at the final screen where the information about the loan amount is presented. The status of the application is Disbursed.

**The contracts have been
signed!**



30,500 EUR

Are now in your account

All the documents that you have signed have been resent to your email with the signature. Please keep them safely

Get started with Internet/ Mobile Banking where you will access the funds.

Before you go, give this experience a rating to help us improve for your next visit.

[Give us a review](#)

[Skip review](#)

It is essential to store data about the experience of the customer. By clicking **Give feedback** a new page is displayed with a feedback form:

- Rate the experience.
- Select from the list from where you heard about the bank.
- Insert the email address of a friend who is looking for a loan to get a discount on your installment.

Give us a rating for the experience



Where did you hear about us?

TV

Do you want to help a friend?

Give and take. We give you a 5% discount for your first installment and your friend gets a discount of 5% off their first installment.

Add a friend's email address

chris.allen@mail.com

Send

Thank you for banking with us. Enjoy your loan!

Continue

NOTE

The feedback information is stored in the database with the use of a server automation script named `FTOS_BARET_AddFeedback`. For the referral, see "`FTOS_BNKAP_SendReferralEmail`" on page 150 and "`FTOS_BNKAP_ValidateReferral`" on page 151. For details see "Validations" on page 140.

Thank you for banking with us!



30,500 EUR

Are now in your account

You can now enjoy your funds!

[Home](#)

Another added advantage for the customer is the referral email. The system allows the customer to insert a friend's email and introduce them to this loan origination process. The system sends an email to that address with the details about the offer.

To return to the homepage, click **Go to homepage**.

Installation

Supported Operating Systems:

Minimum version	Maximum version
Android 8	Android 11
iOS 12	iOS 14.7.1

Prerequisites:

- Download the package with the solution from the [Marketplace](#).
- Install the package from the App Store on an environment **FintechOS 21.1.4.0** with the Studio, Portal and B2C Portal configured. For details on B2C, see [Setting B2C Environment](#).
- Have **Professional Banking SysPacks v21.1.6000** installed on the aforementioned environment.
- Configure the **JobServer**.

Import Packages:

Once you downloaded the package, unzip the package. It has several files. It contains:

- The library with custom controls
- The One-Time-Password 2.0 package
- The Banking products
- The Custom files and the report document templates

- The solution with the templates for the B2C Portal
- An installation Guide and Test Cases.

1 Import the packages

1. Open FintechOS Studio, navigate to the **DevOps** menu, select the **Deployment Packages**. The **Deployment Packages List** page opens.
2. At the top-right corner of the page, click the **Import deployment package** icon. The Open pop-up appears.

NOTE

For details on how to import, see [Importing a Deployment Package](#).

Browse for the deployment packages:

- a. Import **00.Custom Controls**
- b. Import **01.Solution**
- c. Import **02.OTP 2.0**.

2 Complete the Channel Information

1. Open the FintechOS Studio, navigate to the **Digital Frontends** menu, select the **Digital Experience Portals**, then **Dashboards**. In the Dashboard of your environment, add the entity form for the entity **FTOS_DFP_OTP_Channels**.

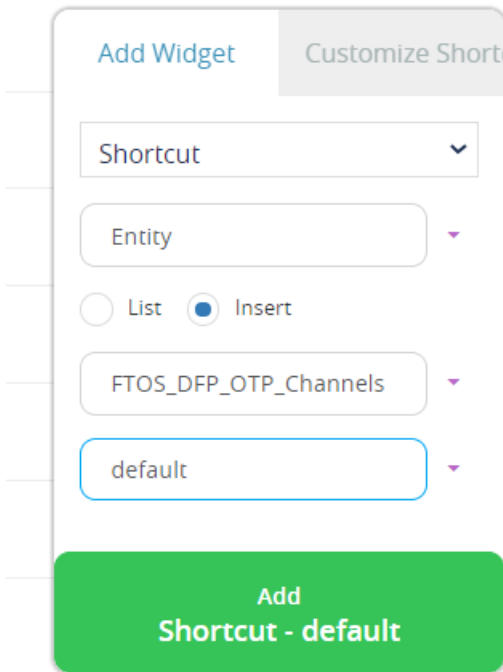
MOBILE RETAIL LOAN ORIGINATION USER GUIDE

Name (only visible for add entity) FTOS_DFP_OTP_Channels
 Display Name FTOS_DFP_OTP_CommunicationChannels
 DisplayCollectionName FTOS_DFP_OTP_Channels
 Description
 PrimaryAttribute Name name
 PrimaryAttributeDisplay Name name
 Default Entity Status Active ✓
 Is Audited
 Business Workflow ✓
 Optimization Search Data (Filter starts with)

DATA MODEL

DATA FORMS

ID	Entity	Name	Default	Is Default For Edit
1	FTOS_DFP_OTP_Channels	default	(A)	(A)



- Update the **FTOS_DFP_OTP_Channels** with details regarding both channels from the shortcut on the Portal added above.

i. Email:

Field	Value
Channel Provider	FTSOEmailGateway
Communication Channel Id	Email
Message Status	New
name	Email
Provider Status	1

FTOS_DFP_OTP_COMMUNICATIONCHANNELS

Channel Provider ↓ ✎

Communication Channel Id ↓ ✎

Message Status ↓ ✎

name

Provider Status ↓ ✎

ii. SMS:

Field	Value
Channel Provider	FTSOSmsOTP
Communication Channel Id	Sms
Message Status	New
name	SMS
Provider Status	1

FTOS_DFP_OTP_COMMUNICATIONCHANNELS

Channel Provider ↓ ✎

Communication Channel Id ↓ ✎

Message Status ↓ ✎

name

Provider Status ↓ ✎

3 Business Formulas

From the main menu open **Fintech Automation** -> **Business Formulas** -> **Formula**. Open each formula to set it from draft to active. Repeat the action with **Data sets**. For details on the formulas used and data sets, see "[Configuring the Business Formulas](#)" on page 92.

4 Banking Products

1. Open the FintechOS Studio, navigate to the **DevOps** menu, select the **Deployment Packages**. The **Deployment Packages List** page opens.
2. At the top-right corner of the page, click the **Import deployment package** icon. The Open pop-up appears.

NOTE

For details on how to import, see [Importing a Deployment Package](#).

3. Browse for the deployment packages **03.Default Banking Products**.
4. From the main menu open **Banking Product Factory -> Banking Products**. From the list of products choose the products used in this solution (Classic, BP1; Flexible, BP2; Savvy, BP3; Smart, BP4; Basic, BP5; Shopping Credit Card, CC1; Fying Credit Card, CC2) and add the risk formula:

Name	Description	Formula
Q	Q	Q
Fixed Interest Formula	Fixed Interest Formula	Fixed Interest

IMPORTANT!

Activate the banking products. They are in draft state after import.

5 Additional Folders

1. From Additional Folders copy the **custom folder** in the B2C root directory.
2. From Additional Folders copy **UploadEBS** in the environment storage.

IMPORTANT!

To enable Onfido for the "Know Your Customer" on page 27 step, place the dedicated key in the web.config file.

6 System Parameters

1. Open the FintechOS Studio, navigate to the **Admin** menu, then **System parameters**, set the following parameter to TRUE in order to hide *Record Update* message.

SYSTEM PARAMETERS LIST

<input type="checkbox"/>	Name	Parameter Value	Is System
<input type="checkbox"/>	recor	q	(All)
<input type="checkbox"/>	sys-disable-record-insert-update-delete-message	true	<input checked="" type="checkbox"/>

2. Open the system parameters named **B2CProxy**. Set the following parameter with the URL of your B2C Proxy in the field Parameter Value.

EDIT SYSTEM PARAMETER

SYSTEM PARAMETER

Name

Parameter Value

Is System

Description

Configurations Walkthrough

The following chapter of this guide is meant to explain the automation processors used to build the products, formulas and statuses, as well as technical details of how automation scripts aid the validation process or the process of comparing, returning and storing data. Automation is a powerful way to make business processes more time-efficient. Automation Processors can help achieve exactly that. They can be configured to be consumed by any digital journey using FintechOS Studio. The Mobile Retail Loan Origination digital journey is comprised of several automation processors that ensure a smooth process of applying for a loan.

Several banking products were configured to offer the customer an actual product, with a tenor, maturity date, interest and commission. This section of the user guide unveils information about which code snippet was used where, and what it enables in the journey.

Furthermore, there are different statuses to let the user know in which stage they are during the journey. To create a personalized Mobile Retail Loan Origination digital journey to fit your banking requirements and offerings, more automation processors and other features are available in the FintechOS Studio to build a customer-centric digital flow.

Additionally, you can modify the user interface to fit your brand. There are several modifications that can be made without the need for writing code. For more details, see [Digital Experience Portals](#). However, if you need advanced modifications editing the CSS file found by accessing FintechOS Studio > Digital Experience > Digital Journeys > Form Driven Flow > the record you need to modify > General, and scroll down to the field Style Sheets.

Consult the following pages to read more on the internal set-up of the solution:

Configuring the Business Workflows Processor	83
Configuring the Business Formulas	92
Business Formulas	93
Formula Parameter Mapping	96
Data Sets	98
Configuring the Banking Products	99

Discounts	123
Configuring the Documents	124
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FTOS_DFP_OTP	126
Sliders_Parameters	128
Computer Vision & Face recognition & Liveness	129
Email&SMS Generation	138
Email	138
SMS	140
Validations	140
Server automation Scripts	147
ANAF & Credit Bureau Integration	157

Configuring the Business Workflows Processor

The Business Workflows Processor uses rules-driven business transitions between statuses to help a bank see the status of an application. It renders the status of a record, i.e. in this case the loan application, in the workflow and provides processing that must occur for the application to move to the next step in its life cycle. For the Mobile Retail Loan Origination, there is an end-to-end self-service flow.

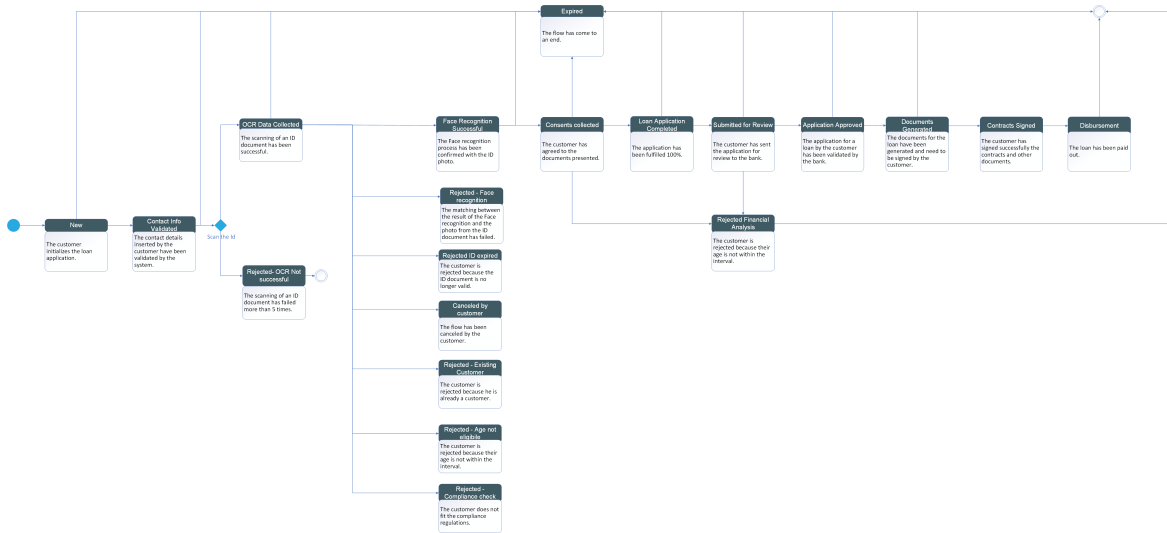
HINT

The statuses can be used as input to generate reports and see the number of successful applications or to see the status of each borrower.

These are the following configurations:

The name is **BARET_Loan_RetailLoan** attached to the entity **FTOS_Baret_Loan**.

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To download the diagram, click [here](#).

Here is a list with the statuses and a definition for what it marks:

Status	Description
New	The customer initializes the loan application.
ContactInfoValidated	The contact details inserted by the customer have been validated by the system.
OCRDataColected	The scanning of an ID document has been successful.
ConsentsCollected	The customer has agreed to the documents presented.
DocumentsGenerated	The documents for the loan have been generated and need to be signed by the customer.
FaceRecognitioSuccesful	The Face recognition process has been confirmed with the ID photo.
ContractsSigned	The customer has signed successfully the contracts and other documents.
LoanApplicationComplete	The application has been fulfilled 100%.
SubmittedForReview	The customer has sent the application for review to the bank.
ApplicationApproved	The application for a loan by the customer has been validated by the bank.
Disbursed	The loan has been paid out.
Expired	The flow has come to an end.
Rejected–AgeNotEligible	The customer is rejected because their age is not within the interval.
Rejected–ComplianceCheck	The customer does not fit the compliance regulations.
Rejected–ExistingCustomer	The customer is rejected because he is already a customer.

Status	Description
Rejected–FaceRecognition	The matching between the result of the Face recognition and the photo from the ID document has failed.
Rejected–FinancialAnalysis	The customer is rejected because their age is not within the interval.
Rejected–IDExpired	The customer is rejected because the ID document is no longer valid.
Rejected–OCRNotSuccessful	The scanning of an ID document has failed.
CanceledByCustomer	The flow was canceled by the customer.

IMPORTANT!

For a loan application to be transitioned to the status Expired, two conditions must be met:

- the application must not have reached the rejected or loan approved statuses
- and
- since the last status change, 30 days have passed without any modification.

Transitions between statuses	Reason for transition	Location	Executed by
ApplicationApproved_ DocumentsGenerated	The borrower has chosen the final offer.	"Signature of Documents" on page 67	
ApplicationApproved_ Expired	The customer has left the application without taking any action.		

MOBILE RETAIL LOAN ORIGINATION USER GUIDE

Transitions between statuses	Reason for transition	Location	Executed by
ConsentsCollected_Expired	The customer has left the application without taking any action.		
ConsentsCollected_LoanApplicationComplete	The consents have been approved to by the borrower and the application has been fulfilled.	"Submit Application" on page 54	"FTOS_BARET_LoanChangeStatus" on page 155 called in the After Events of the step <i>Submit</i> from the flow <i>FTOS_BARET_ApplicationSubmit</i> .
ConsentsCollected_Rejected-FinancialAnalysis	Although the consents have been approved to by the borrower, the borrower's financial profile is not suitable for the loan.	"Application Result" on page 59	

Transitions between statuses	Reason for transition	Location	Executed by
ContactInfoValidated_Expired	Although the information from the contracts have been validated, the borrower has failed to take any further action.		
ContactInfoValidated_OCRDataColected	The email & SMS code have been inserted successfully, and the scanning of the ID document has been successful as well.	"Check Data Collected" on page 42	
ContactInfoValidated_Rejected-OCRNotSuccessful	The email & SMS code have been inserted successfully, and the scanning of the ID document has been unsuccessful.	"Know Your Customer" on page 27	

Transitions between statuses	Reason for transition	Location	Executed by
ContractsSigned_Disbursed	After the contracts have been signed by the borrower and they have been sent to their email, the money are disbursed.	"Congratulations & Feedback" on page 72	"FTOS_BARET_LoanChangeStatus" on page 155 used in the step <i>Done</i> in the form <i>FTOS_BARET_Congratulations</i>
DocumentsGenerated_ContractsSigned	The borrower has agreed to the contracts and they are now signed.	"Signature of Documents" on page 67	"FTOS_BARET_AccountApplication_BusinessWorkflow" on page 151
DocumentsGenerated_Expired	The borrower has agreed to the contracts, but the borrower has not been able to sign them.		
FaceRecognitioSuccessful_ConsentsCollected	The video recording has matched the borrower with the ID picture, and the borrower is giving their consents.	"Consents" on page 50	

Transitions between statuses	Reason for transition	Location	Executed by
FaceRecognitionSuccessful_Expired	The video recording has matched the borrower with the ID picture, but no further action has been taken by the borrower.		
LoanApplicationComplete_Expired	The application has been completed, but it was not sent for analysis.		
LoanApplicationComplete_SubmittedForReview	The application has been completed, it was sent for analysis.	"Submit Application" on page 54	
New_ContactInfoValidated	The application has started, and the email&SMS have been validated.	"Contact Info" on page 23	
New_Expired	The flow as initiated, but then no action has been taken.		

Transitions between statuses	Reason for transition	Location	Executed by
OCRDataColected_ CanceledByCustomer	After the ID was scanned, the borrower abandoned the flow.		
OCRDataColected_Expired	After the ID was scanned, no action has been taken.		
OCRDataColected_ FaceRecognitioSuccesfull	After the ID was scanned, the video recording has matched the borrower with the ID picture.	"Video Recording" on page 47	
OCRDataColected_ Rejected–AgeNotEligible	After the ID was scanned, the borrower is rejected because their age is not in the interval required.	"Check Data Collected" on page 42	

Transitions between statuses	Reason for transition	Location	Executed by
OCRDataColected_ Rejected- ComplianceCheck	After the ID was scanned, the borrower is not in line with the compliance of the bank.		
OCRDataColected_ Rejected- ExistingCustomer	After the ID was scanned, the system determined that the customer (using the PIN) has already a current account opened.		
OCRDataColected_ Rejected-FaceRecognition	After the ID was scanned, the video recording was not able to match the borrower with the ID picture.		

Transitions between statuses	Reason for transition	Location	Executed by
OCRDataColected_Rejected-IDExpired	After the ID was scanned, the borrower was rejected because the ID document was no longer valid.		
SubmittedForReview_ApplicationApproved	After the borrower submitted the request, the bank has approved the loan.	"Application Result" on page 59	"FTOS_BARET_FinancialCalculationsAsync" on page 152
SubmittedForReview_Rejected-FinancialAnalysis	After the borrower submitted the request, the bank did not approve the loan.	"Application Result" on page 59	"FTOS_BARET_FinancialCalculationsAsync" on page 152; in the After Events from the step <i>Waiting</i> from the form <i>FTOS_BARET_Waiting</i>

For more details, see [Business Workflow](#).

Configuring the Business Formulas

Business Formulas processes different inputs from your digital journey in order to generate desired outputs. By inserting arguments and using them in steps, the system creates complex calculations to be triggered in a flow. For this loan solution, there are

several formulas used for the ["Simulation"](#) on page 15, ["Product Selection"](#) on page 17, ["Application Result"](#) on page 59, ["Credit Card"](#) on page 65, ["Some Lifestyle Questions"](#) on page 52, and more.

Business Formulas

This is where you build business formulas based on your business needs. These are the formula names used in this solution:

Name	Business Status
MaxCreditCardLimit	Active
MaxAmountOverMaxTenor	Active
RetailLoanFinancialAnalysis	Active
Scoring	Active
PMTCalculation	Active

Formula Steps

Steps allow you to process a formula in successive stages and to use the output from a step as an input argument in subsequent steps. For each of the formulas below one or more steps were created.

MaxCreditCardLimit

This formula calculates the maximum limit a customer can take on for the selection of a ["Credit Card"](#) on page 65.

Step Name	Master Type	Sub-Type	Calculation Type
availableDTI	Simple Type	Decimal	Normal
maxCreditCardLimit	Simple Type	Decimal	Normal

MaxAmountOverMaxTenor

This formula calculates the maximum value of the installment and uses it to calculate the loan amount.

Step Name	Master Type	Sub-Type	Calculation Type
maxInstallment	Simple Type	Decimal	Normal
loanAmount	Simple Type	Decimal	Normal

Retail Loan Financial Analysis

This formula analyzes the financial situation of the customer and defines the decisions to approve or reject the application.

Step Name	Master Type	Sub-Type	Calculation Type
ClientCategory	Simple Type	Text	Normal
MaxDTI	Simple Type	Decimal	Normal
DTI	Simple Type	Decimal	Normal
Decision	Simple Type	Text	Normal

Scoring

This formula calculates the scoring of a customer based on the following information: Age; Marital Status; Employment Status; the number of Active Loans inserted by the customer in "[Some Lifestyle Questions](#)" on page 52. It defines a decision with the value Approved/Derogation/ Rejected taking into account the scoring and the FICO score.

The FICO values are set as follows $x \geq 700$ is Approved; $520 \leq x < 700$ is Derogation; $x < 520$ is Rejected.

IMPORTANT!

FICO score is set at 720, hence all loans are approved.

Step Name	Master Type	Sub-Type	Calculation Type
Name	Master Type	SubType	CalculationType
SCORE_Age	Simple Type	Whole Number	Normal
SCORE_MaritalStatus	Simple Type	Whole Number	Normal
SCORE_EmploymentStatus	Simple Type	Whole Number	Normal
SCORE_WorstDelinquency	Simple Type	Whole Number	Normal
SCORE_ActiveLoansNo	Simple Type	Whole Number	Normal
ApplicationScore	Simple Type	Whole Number	Normal
FICOScoreDecision	Simple Type	Text	Normal
ApplicationScoreDecision	Simple Type	Text	Normal
Decision	Simple Type	Text	Normal

PMT Calculation

This formula calculates the PMT, calculating the monthly payment: principal and interest required to settle a loan or an investment with a fixed interest rate over a time period.

Step Name	Master Type	SubType	CalculationType
PMTCalculation	Simple Type	Decimal	Normal

Formula Input

Formula arguments are the entity's attributes which hold a single value (be it simple or collection) which will be used as input for the formulas and their steps presented above.

Arguments

CrossSellingCrediCards

Arguments used:

Argument	Master Type	Formula Argument Sub-Type
countryCode	Simple Type	Text
currentInstallment	Simple Type	Decimal
maxInstallment	Simple Type	Decimal

MaxAmountOverMaxTenor

Arguments used:

Argument	Master Type	Formula Argument Sub-Type
income	Simple Type	Decimal
interestRate	Simple Type	Decimal
maxDTI	Simple Type	Decimal
monthlyPaymentsForCreditLimits	Simple Type	Decimal
otherInstallments	Simple Type	Decimal
tenor	Simple Type	Whole Number

RetailLoanFinancialAnalysis

Arguments used:

Argument	Master Type	Formula Argument Sub-Type
applicationScore	Simple Type	Whole Number
creditCardLimits	Simple Type	Decimal
currency	Simple Type	Text
income	Simple Type	Decimal
interestType	Simple Type	Text
loansMonthlyPayment	Simple Type	Decimal
scoringDecision	Simple Type	Text

PMT Input

Arguments used for PMT calculation:

Arguments	Master Type	Formula Argument Sub-Type
interestRate	Simple Type	Decimal
loanAmount	Simple Type	Decimal
numberOfMonthsOfPayments	Simple Type	Whole Number

Scoring

Arguments used:

Arguments	Master Type	Formula Argument Sub-Type
activeLoansNo	Simple Type	Whole Number
age	Simple Type	Whole Number
employmentStatus	Simple Type	Whole Number
FICOScore	Simple Type	Whole Number
maritalStatus	Simple Type	Text
worstDelinquency	Simple Type	Whole Number

Formula Parameter Mapping

Here the results are mapped on to the entity attributes.

Name	Master Entity	Data Mapping Type	Operation Name
PMTCalculation_FixedInterestFormula_Basic_1622711527525_formula		Banking Product	PMTCalculation
RetailLoanFinancialAnalyses_formula_FTOS_BARET_Loan	FTOS_BARET_Loan	Formula	RetailLoanFinancialAnalyses
Scoring_formula_FTOS_BNKAP_RetailApplicantData	FTOS_BNKAP_RetailApplicantData	Formula	Scoring

RetailLoanFinancialAnalyses_formula_FTOS_BARET_Loan

Input	Attribute	Output	Attribute
FTOS_BARET_Loan - Input		FTOS_BARET_Loan - Output	
applicationScore	score from Pricing	ClientCategory	No mapping needed
creditCardLimits	totalCreditCardsLimits from financialDataId	MaxDTI	MaxDTI from financialDataId
currency	name from loanCurrency	DTI	DTI from financialDataId
income	incomeDeclared from financialDataId	Decision	No mapping needed
interestType	interestTypeId from Pricing		
loansMonthlyPayment	totalOtherLoansMonthlyPayments from financialDataId		
scoringDecision	No mapping needed		

Scoring_formula_FTOS_BNKAP_RetailApplicantData

Input	Attribute	Output	Attribute
FTOS_BNKAP_RetailApplicantData - Input		FTOS_BNKAP_RetailApplicantData - Output	
activeLoansNo	activeLoansNo from FinancialData	SCORE_Age	No mapping needed
age	Age from FTOS_BNKAP_RetailApplicantData	SCORE_MaritalStatus	No mapping needed
employmentStatus	Occupation from FTOS_BNKAP_RetailApplicantData	SCORE_EmploymentStatus	No mapping needed
FICOScore	ficoScore from FinancialData	SCORE_WorstDelinquency	No mapping needed
maritalStatus	Marital status from FTOS_BNKAP_RetailApplicantData	SCORE_ActiveLoansNo	No mapping needed
worstDelinquency	worstDelinquency from FinancialData	ApplicationScore	No mapping needed
		Decision	No mapping needed

Data Sets

Data sets are mappings that associate values for a set of discriminants to values. This is where the limits are set by each bank. To the data found in these sets the system compares the results from a customer to see if they fit in the matrix.

Name	Business Status	Used in Formula
MaxDTI	Active	RetailLoanFinancialAnalysis
CrossSellingCardCoefficient	Active	MaxCreditCardLimit
CreditCardAdjCoeff	Active	RetailLoanFinancialAnalysis
FINCALC_ClientCategory	Active	RetailLoanFinancialAnalysis
ApplicationScoreDecision	Active	RetailLoanFinancialAnalysis
SCORING_MaritalStatus	Active	Scoring

Name	Business Status	Used in Formula
SCORING_WorstDelinquency	Active	Scoring
FICOScoreDecision	Active	Scoring
SCORING_ActiveLoansNo	Active	Scoring
SCORING_EmploymentStatus	Active	Scoring
SCORING_Age	Active	Scoring

For more details, see [Business Formulas](#).

Configuring the Banking Products

This processor creates and maintains products that are used in FintechOS form driven flows and later in digital journeys. To visualize and to administer them, access the dedicated menu for Banking Product Factory within the FintechOS Studio. It offers configurations such as product dimensions for commissions and interests and product filter to navigate through the list of products created based on a filtering scope. After installation, the Mobile Retail Loan Origination journey has banking products configured with the active status.

HINT

The products from the package that can be used are those that are valid in between the given start date and end date. Additionally, the products which have the active status are displayed in the journey.

For this solution, several banking products were configured for loans and two for credit cards:

- Classic, BP1
- Flexible, BP2
- Savvy, BP3
- Smart, BP4
- Basic, BP5

- Shopping Credit Card, CC1
- Flying Credit Card, CC2.

The system calculates the input values (amount and period) to return a suggestion from the five loans to the customer. In FintechOS Studio, the values inputted by the customer are registered, afterwards the system calls for the maximum and minimum amounts and periods for each banking product. For details, see the server automation script "[FTOS_BARET_FilterAvailableProductsAmountAndPeriod](#)" on page 148.

Depending on the values inserted, the system checks to see whether the values are found within the minimum and maximum or each banking product listed above. Then, it lists the top 3 (or less depending on the result) based on the order in the naming of the products. To change the maximum number of three products displayed navigate to the form FTOS_BARET_LoanSimulation, step Simulation, Advanced, After Events and in the code change the property `maxProductsDisplayed` from 3 to the needed number in the array `params`.

1 Classic

This banking product has the following configurations:

Main Info

Fields	Description	Example
Product Type	Select from the list the entry bank account.	Term Loan
Banking Product code	Insert a unique code.	BP1
Name	Insert a suggestive name.	Classic
Class	This ladder is designed to categorize the major banking products any bank offers.	Retail
Subclass	These are subordinated to the classes above.	Loan
Category	This ladder is designed to categorize the banking products.	Unsecured Loan
Start date	Select the date when to have the product valid.	27/05/2021
End date	Select the date when the product availability ends.	01/10/2029

Fields	Description	Example
Benefits	Insert the advantages of owning the banking product. You can format the text in the text editor window.	<ul style="list-style-type: none"> • Fixed rate for the entire loan duration • Life and unemployment benefits included
Conditions	Insert the conditions for the applicant.	<ul style="list-style-type: none"> • At least 18 years of age • Over 3 months period at the current employer • Have an overall employment period of 2 years in the work field • Have good credit behaviour.

Details

Fields	Description	Example
Banking Account Type	Choose Savings Account from the list.	Loan Term Account

Fields	Description	Example
Interest Payment Type	Choose one from the following: <ul style="list-style-type: none"> • Monthly • Maturity • Yearly • Daily • Quarterly. 	Monthly
Payment Schedule Type	Determine the details about the installments.	Equal Installment Monthly 360

Payment Schedule Type Details

Column Repayment Schedule	Calculation Method	Fee	Insurance class	Source
RemainingValue	RemainingFormula			
PMT	FixedValue			
Interest	Effective Rate			
Principal	ColumnFormula			
AdministrationFee	FixedValue	Monthly Fee		SourceValue
AnalysisFee	Effective Rate	Analysis Fee		SourceValue
LifeInsurance	Effective Rate		Life Insurance	SourcePercent
TotalInstallment	ColumnFormula			

Product Destination Types

- A home project caught my eye
- For funeral expenses
- I am planning a relaxing holiday

- I don't wanna disclose my loan destination
- I have a medical urgency
- I need some new tech products
- I want to buy a car
- I want to buy some household items
- I want to invest in education
- I'm planning a wedding
- Legal fees
- Other
- Shopping is my addiction

Availability

Fields	Description	Example
Currency	Choose the currency for this banking product.	EUR
Period Type	Choose one: <ul style="list-style-type: none"> • Days • Weeks • Months • Years 	
Minimum Period	This is the minimum duration of the product mentioned in the contract.	1
Maximum Period	This is the maximum duration of the product mentioned in the contract.	60
Minimum Amount	This is the minimum amount of the product for which the bank will open a contract.	1,000
Maximum Amount	This is the maximum amount of the product for which the bank will open a contract.	50,000

Other details:

Fields	Example
Interest & Commissions	fixed interest
Insurance	life insurance
Discounts	income receiving
Risk Formula	Interest Formula. See PMT Calculation from " Configuring the Business Formulas " on page 92.

Documents

Docuement	Operation Code
FEIS ¹	FEIS
CurrentAccountContract	Current Account Contract
InsuranceAgreement	Insurance Policy
PersonalLoanAgreement	Loan Contract

2 BP2

This banking product has the following configurations:

Main Info

Fields	Description	Example
Product Type	Select from the list the entry bank account.	Term Loan
Banking Product code	Insert a unique code.	BP2
Name	Insert a suggestive name.	Flexible
Class	This ladder is designed to categorize the major banking products any bank offers.	Retail
Subclass	These are subordinated to the classes above.	Loan

¹The European Fund for Strategic Investment (EFSI) is an initiative launched jointly by the European Investment Bank Group – the European Investment Bank and European Investment Fund and the European Commission to help overcome the current investment gap in the EU. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around the continent to ensure that money reaches the real economy.

Fields	Description	Example
Category	This ladder is designed to categorize the banking products.	Unsecured Loan
Start date	Select the date when to have the product valid.	27/05/2021
End date	Select the date when the product availability ends.	01/10/2029
Benefits	Insert the advantages of owning the banking product. You can format the text in the text editor window.	<ul style="list-style-type: none"> • 9 months grace period • Fixed rate for the entire loan duration
Conditions	Insert the conditions for the applicant.	<ul style="list-style-type: none"> • At least 18 years of age • Over 3 months period at the current employer • Have an overall employment period of 2 years in the work field • Have good credit behaviour

Details

Fields	Description	Example
Banking Account Type	Choose Savings Account from the list.	Loan Term Account

Fields	Description	Example
Interest Payment Type	Choose one from the following: <ul style="list-style-type: none"> • Monthly • Maturity • Yearly • Daily • Quarterly. 	Monthly
Payment Schedule Type	Determine the details about the installments.	Equal Installment Monthly 360

Payment Schedule Type Details

Column Repayment Schedule	Calculation Method	Fee	Insurance class	Source
RemainingValue	RemainingFormula			
PMT	FixedValue			
Interest	Effective Rate			
Principal	ColumnFormula			
AdministrationFee	FixedValue	Monthly Fee		SourceValue
AnalysisFee	Effective Rate	Analysis Fee		SourceValue
LifeInsurance	Effective Rate		Life Insurance	SourcePercent
TotalInstallment	ColumnFormula			

Product Destination Types

- A home project caught my eye
- For funeral expenses
- I am planning a relaxing holiday

- I don't wanna disclose my loan destination
- I have a medical urgency
- I need some new tech products
- I want to buy a car
- I want to buy some household items
- I want to invest in education
- I'm planning a wedding
- Legal fees
- Other
- Shopping is my addiction

Availability

Fields	Description	Example
Currency	Choose the currency for this banking product.	EUR
Period Type	Choose one: <ul style="list-style-type: none"> • Days • Weeks • Months • Years 	Months
Minimum Period	This is the minimum duration of the product mentioned in the contract.	1
Maximum Period	This is the maximum duration of the product mentioned in the contract.	57
Minimum Amount	This is the minimum amount of the product for which the bank will open a contract.	1000
Maximum Amount	This is the maximum amount of the product for which the bank will open a contract.	40000

Other details:

Fields	Example
Interest & Commissions	fixed interest
Discounts	income receiving
Risk Formula	Fixed Interest Formula. See PMT Calculation from "Configuring the Business Formulas" on page 92.

Documents

Docuement	Operation Code
FEIS ¹	FEIS
CurrentAccountContract	Current Account Contract
PersonalLoanAgreement	Loan Contract

3 BP3

This banking product has the following configurations:

Main Info

Fields	Description	Example
Product Type	Select from the list the entry bank account.	Term Loan
Banking Product code	Insert a unique code.	BP3
Name	Insert a suggestive name.	Savvy
Class	This ladder is designed to categorize the major banking products any bank offers.	Retail
Subclass	These are subordinated to the classes above.	Loan
Category	This ladder is designed to categorize the banking products.	Unsecured Loan

¹The European Fund for Strategic Investment (EFSI) is an initiative launched jointly by the European Investment Bank Group – the European Investment Bank and European Investment Fund and the European Commission to help overcome the current investment gap in the EU. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around the continent to ensure that money reaches the real economy.

Fields	Description	Example
Start date	Select the date when to have the product valid.	27/05/2021
End date	Select the date when the product availability ends.	01/10/2029
Benefits	Insert the advantages of owning the banking product. You can format the text in the text editor window.	<ul style="list-style-type: none"> • Floating rate for the entire loan duration • Lowest monthly cost
Conditions	Insert the conditions for the applicant.	<ul style="list-style-type: none"> • Be over 18 years old • Over 3 months period at the current employer • Have an overall employment period of 2 years in the work field • Have good credit behaviour

Details

Fields	Description	Example
Banking Account Type	Choose Savings Account from the list.	Loan Term Account

Fields	Description	Example
Interest Payment Type	Choose one from the following: <ul style="list-style-type: none"> • Monthly • Maturity • Yearly • Daily • Quarterly. 	Monthly
Payment Schedule Type	Determine the details about the installments.	Equal Installment Monthly 360

Payment Schedule Type Details

Column Repayment Schedule	Calculation Method	Fee	Insurance class	Source
RemainingValue	RemainingFormula			
PMT	FixedValue			
Interest	Effective Rate			
Principal	ColumnFormula			
AdministrationFee	FixedValue	Monthly Fee		SourceValue
AnalysisFee	Effective Rate	Analysis Fee		SourceValue
LifeInsurance	Effective Rate		Life Insurance	SourcePercent
TotalInstallment	ColumnFormula			

Product Destination Types

- A home project caught my eye
- I want to buy a car.

Availability

Fields	Description	Example
Currency	Choose the currency for this banking product.	EUR
Period Type	Choose one: <ul style="list-style-type: none"> • Days • Weeks • Months • Years 	Months
Minimum Period	This is the minimum duration of the product mentioned in the contract.	1
Maximum Period	This is the maximum duration of the product mentioned in the contract.	60
Minimum Amount	This is the minimum amount of the product for which the bank will open a contract.	1000
Maximum Amount	This is the maximum amount of the product for which the bank will open a contract.	60000

Other details

Fields	Example
Interest & Commissions	floating interest
Discounts	income receiving
Risk Formula	Floating Rate. See PMTCalculation from "Configuring the Business Formulas" on page 92.

Documents

Docuement	Operation Code
FEIS ¹	FEIS
CurrentAccountContract	Current Account Contract

¹The European Fund for Strategic Investment (EFSI) is an initiative launched jointly by the European Investment Bank Group – the European Investment Bank and European Investment Fund and the European Commission to help overcome the current investment gap in the EU. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around the continent to ensure that money reaches the real economy.

Docuement	Operation Code
PersonalLoanAgreement	Loan Contract

4 BP4

This banking product has the following configurations:

Main Info

Fields	Description	Example
Product Type	Select from the list the entry bank account.	Term Loan
Banking Product code	Insert a unique code.	BP3
Name	Insert a suggestive name.	Smart
Class	This ladder is designed to categorize the major banking products any bank offers.	Retail
Subclass	These are subordinated to the classes above.	Loan
Category	This ladder is designed to categorize the banking products.	Unsecured Loan
Start date	Select the date when to have the product valid.	27/05/2021
End date	Select the date when the product availability ends.	01/10/2029
Benefits	Insert the advantages of owning the banking product. You can format the text in the text editor window.	<ul style="list-style-type: none"> • Floating rate for the entire loan duration • Life and unemployment benefits included

Fields	Description	Example
Conditions	Insert the conditions for the applicant.	<ul style="list-style-type: none"> • Be over 18 years old • Over 3 months period at the current employer • Have an overall employment period of 2 years in the work field • Have good credit behaviour

Details

Fields	Description	Example
Banking Account Type	Choose Savings Account from the list.	Loan Term Account
Interest Payment Type	Choose one from the following: <ul style="list-style-type: none"> • Monthly • Maturity • Yearly • Daily • Quarterly. 	Monthly
Payment Schedule Type	Determine the details about the installments.	Equal Installment Monthly 360

Payment Schedule Type Details

Column Repayment Schedule	Calculation Method	Fee	Insurance class	Source
RemainingValue	RemainingFormula			
PMT	FixedValue			
Interest	Effective Rate			
Principal	ColumnFormula			
AdministrationFee	FixedValue	Monthly Fee		SourceValue
AnalysisFee	Effective Rate	Analysis Fee		SourceValue
LifeInsurance	Effective Rate		Life Insurance	SourcePercentage
TotalInstallment	ColumnFormula			

Product Destination Types

- I am planning a relaxing holiday.

Availability

Fields	Description	Example
Currency	Choose the currency for this banking product.	EUR
Period Type	Choose one: <ul style="list-style-type: none"> • Days • Weeks • Months • Years 	Months
Minimum Period	This is the minimum duration of the product mentioned in the contract.	1
Maximum Period	This is the maximum duration of the product mentioned in the contract.	60
Minimum Amount	This is the minimum amount of the product for which the bank will open a contract.	1000

Fields	Description	Example
Maximum Amount	This is the maximum amount of the product for which the bank will open a contract.	60000

Other details

Fields	Example
Interest & Commissions	Smart
Insuarncce	Smart
Discounts	income receiving
Risk Formula	Smart Formula. See PMTCalculation from "Configuring the Business Formulas" on page 92.

Documents

Docuement	Operation Code
FEIS ¹	FEIS
CurrentAccountContract	Current Account Contract
PersonalLoanAgreement	Loan Contract
InsuranceAgreement	Insurance Policy

5 BP5

This banking product has the following configurations:

Main Info

Fields	Description	Example
Product Type	Select from the list the entry bank account.	Term Loan
Banking Product code	Insert a unique code.	BP3
Name	Insert a suggestive name.	Basic

¹The European Fund for Strategic Investment (EFSI) is an initiative launched jointly by the European Investment Bank Group – the European Investment Bank and European Investment Fund and the European Commission to help overcome the current investment gap in the EU. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around the continent to ensure that money reaches the real economy.

Fields	Description	Example
Class	This ladder is designed to categorize the major banking products any bank offers.	Retail
Subclass	These are subordinated to the classes above.	Loan
Category	This ladder is designed to categorize the banking products.	Unsecured Loan
Start date	Select the date when to have the product valid.	27/05/2021
End date	Select the date when the product availability ends.	01/10/2029
Benefits	Insert the advantages of owning the banking product. You can format the text in the text editor window.	<ul style="list-style-type: none"> • Fixed rate for the entire loan duration • Most versatile
Conditions	Insert the conditions for the applicant.	<ul style="list-style-type: none"> • Be over 18 years old • Over 3 months period at the current employer • Have an overall employment period of 2 years in the work field • Have good credit behaviour

Details

Fields	Description	Example
Banking Account Type	Choose Savings Account from the list.	Loan Term Account
Interest Payment Type	Choose one from the following: <ul style="list-style-type: none"> • Monthly • Maturity • Yearly • Daily • Quarterly. 	Monthly
Payment Schedule Type	Determine the details about the installments.	Equal Installment Monthly 360

Payment Schedule Type Details

Column Repayment Schedule	Calculation Method	Fee	Insurance class	Source
RemainingValue	RemainingFormula			
PMT	FixedValue			
Interest	Effective Rate			
Principal	ColumnFormula			
AdministrationFee	FixedValue	Monthly Fee		SourceValue
AnalysisFee	Effective Rate	Analysis Fee		SourceValue
LifeInsurance	Effective Rate		Life Insurance	SourcePercent
TotalInstallment	ColumnFormula			

Product Destination Types

- A home project caught my eye
- For funeral expenses
- I am planning a relaxing holiday
- I don't wanna disclose my loan destination
- I have a medical urgency
- I need some new tech products
- I want to buy a car
- I want to buy some household items
- I want to invest in education
- I'm planning a wedding
- Legal fees
- Other
- Shopping is my addiction

Availability

Fields	Description	Example
Currency	Choose the currency for this banking product.	EUR
Period Type	Choose one: <ul style="list-style-type: none"> • Days • Weeks • Months • Years 	Months
Minimum Period	This is the minimum duration of the product mentioned in the contract.	1

Fields	Description	Example
Maximum Period	This is the maximum duration of the product mentioned in the contract.	60
Minimum Amount	This is the minimum amount of the product for which the bank will open a contract.	1000
Maximum Amount	This is the maximum amount of the product for which the bank will open a contract.	60000

Other details

Fields	Example
Interest & Commissions	Basic
Discounts	Basic
Risk Formula	Basic. See PMTCalculation from " Configuring the Business Formulas " on page 92.

Documents

Docuement	Operation Code
FEIS ¹	FEIS
CurrentAccountContract	Current Account Contract
PersonalLoanAgreement	Loan Contract

6

This banking product has the following configurations:

Main Info

Fields	Description	Example
Product Type	Select from the list the entry bank account.	Credit Card

¹The European Fund for Strategic Investment (EFSI) is an initiative launched jointly by the European Investment Bank Group – the European Investment Bank and European Investment Fund and the European Commission to help overcome the current investment gap in the EU. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around the continent to ensure that money reaches the real economy.

Fields	Description	Example
Banking Product code	Insert a unique code.	CC1
Name	Insert a suggestive name.	Shopping Credit Card
Class	This ladder is designed to categorize the major banking products any bank offers.	Retail
Subclass	These are subordinated to the classes above.	Loan
Category	This ladder is designed to categorize the banking products.	Credit Card
Start date	Select the date when to have the product valid.	27/05/2021
End date	Select the date when the product availability ends.	01/10/2029
Benefits	Insert the advantages of owning the banking product. You can format the text in the text editor window.	<ul style="list-style-type: none"> • Earn up to 2% cash back • Free 2-day shipping on Amazon.com

Details

Fields	Description	Example
Banking Account Type	Choose Savings Account from the list.	Loan Term Account
Interest Payment Type	Choose one from the following: <ul style="list-style-type: none"> • Monthly • Maturity • Yearly • Daily • Quarterly. 	Monthly

Availability

Fields	Description	Example
Currency	Choose the currency for this banking product.	EUR
Period Type	Choose one: <ul style="list-style-type: none"> • Days • Weeks • Months • Years 	Months
Minimum Amount	This is the minimum amount of the product for which the bank will open a contract.	500
Maximum Amount	This is the maximum amount of the product for which the bank will open a contract.	5000

Document

Document	Operation Code
CreditCardContract	Credit Cart Contract

7 CC2

This banking product has the following configurations:

Main Info

Fields	Description	Example
Product Type	Select from the list the entry bank account.	Credit Card
Banking Product code	Insert a unique code.	CC2
Name	Insert a suggestive name.	Flying Credit Card
Class	This ladder is designed to categorize the major banking products any bank offers.	Retail
Subclass	These are subordinated to the classes above.	Loan

Fields	Description	Example
Category	This ladder is designed to categorize the banking products.	Credit Card
Start date	Select the date when to have the product valid.	27/05/2021
End date	Select the date when the product availability ends.	01/10/2029
Benefits	Insert the advantages of owning the banking product. You can format the text in the text editor window.	<ul style="list-style-type: none"> • 4 Upgraded Boardings a year • 9,000 points on each card member anniversary.
Product Features	Added details about the benefits of the card.	<ul style="list-style-type: none"> • No balance transfer fee • Travel perks.

Details

Fields	Description	Example
Banking Account Type	Choose Savings Account from the list.	Loan Term Account
Interest Payment Type	Choose one from the following: <ul style="list-style-type: none"> • Monthly • Maturity • Yearly • Daily • Quarterly. 	Monthly

Availability

Fields	Description	Example
Currency	Choose the currency for this banking product.	EUR
Period Type	Choose one: <ul style="list-style-type: none"> • Days • Weeks • Months • Years 	Months
Minimum Amount	This is the minimum amount of the product for which the bank will open a contract.	500
Maximum Amount	This is the maximum amount of the product for which the bank will open a contract.	5000

Document

Document	Operation Code
CreditCardContract	Credit Card Contract

Discounts

Banking Product	Value of the Discount applied
Smart	1.5
Savvy	1
Basic	2
Flexible	1
Classic	1

For more details about this automation processor, see [Banking Product Factory v2.2.6000](#).

Configuring the Documents

The Mobile Retail Loan Origination solution used in the flow five documents which are signed by the customer at the end of the journey. The templates are imported with the package and they have the extension .docx. Furthermore, these files are attached to the digital documents which use SQL Procedures as source and finally, reports are attached to the entity pointing to the documents. They are used in the flow via actions of generating digital documents and added to the UI, where they become accessible to the customer.

The following list contains the documents generated for the solution:

Name	Data Source Type	Stored Procedure
CreditCardContract	SQL Stored Procedure	[ebs].[FTOS_CreditCardContract] @Id
CurrentAccountContract	SQL Stored Procedure	[ebs].[FTOS_CurrentAccountContract] @Id
FEIS	SQL Stored Procedure	[ebs].[FTOS_FEIS] @Id
InsuranceAgreement	SQL Stored Procedure	[ebs].[FTOS_LoanInsuranceAgreement]@Id
PersonalLoanAgreement	SQL Stored Procedure	[ebs].[FTOS_PersonalLoanAgreement] @Id

The reports are:

Name	Output Method	Scope	Entity	Report Item	Destination Attribute
CreditCardContract	Attach to entity	Entity	FTOS_BNKAP_ApplicationDocument	CreditCardContract	documentFile
CurrentAccountContract	Attach to entity	Entity	FTOS_BNKAP_ApplicationDocument	CurrentAccountContract	documentFile

Name	Output Method	Scope	Entity	Report Item	Destination Attribute
FEIS	Attach to entity	Entity	FTOS_BNKAP_ApplicationDocument	FEIS	documentFile
InsuranceAgreement	Attach to entity	Entity	FTOS_BNKAP_ApplicationDocument	InsuranceAgreement	documentFile
PersonalLoanAgreement	Attach to entity	Entity	FTOS_BNKAP_ApplicationDocument	PersonalLoanAgreement	documentFile

For more details, see [Digital Documents Processor](#).

Configuring the Digital Flow Settings

For automation processors such as Computer Vision, Onfido and the email and SMS generation, the configurations were done via JavaScript code with settings and mappings.

Name	Description	Flow Settings	Digital Processor Type	Source entity name
FTOS_DFP_OTP	It is used to generate the one-time-password.	MobileLoan	OTP ¹	FTOS_BNKAP_RetailApplicantData
OCR_DrivingLicense	This is the Computer Vision processor to scan the driving license.	MobileLoan	OCR ²	FTOS_BNKAP_RetailApplicantData

¹One-Time-Password. It is a password generated by the system to validate a piece of information or sign a document.

²The employability of technology to recognize scanned documents.

Name	Description	Flow Settings	Digital Processor Type	Source entity name
OCR_ID	This is the Computer Vision processor to scan the ID card.	MobileLoan	OCR	FTOS_BNKAP_RetailApplicantData
OCR_Passport	This is the Computer Vision processor to scan the password.	MobileLoan	OCR	FTOS_BNKAP_RetailApplicantData
Onfido	This is an integration with the provider Onfido.	MobileLoan	Onfido	FTOS_BNKAP_RetailApplicantData
OTP_EmailAndSms	This holds the setting for the generation of the email and SMS one-time-password.	MobileLoan	OTP	FTOS_BNKAP_RetailApplicantData
Sliders_Parameters	This holds the settings for the sliders parameters for the amount and period.	MobileLoan	N/A	N/A

FTOS_DFP_OTP

Settings	Value	Description
Name	Email	The channel.
RelatedEntityName	FTOS_BNKAP_RetailApplicantData	The entity.
RelatedAttribute	email	The attribute from where the address is extracted and used to send the codes to.
LookupAttribute	FTOS_BNKAP_RetailApplicantDataid	

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Settings	Value	Description
OTPDigitsNumber	4	The number of numbers of the code.
MaxRetry	5	The maximum number of retries to insert the code.
MaxResendRetry	3	The maximum number of emails sent.
MaxResendRetryIntervalSeconds	120	The interval between the sending of the emails.
RelatedAttribute	email	The channel.
LookupAttribute	FTOS_BNKAP_RetailApplicantDataid	The primary key.
OTPDigitsNumber	4	The number of numbers of the code.
MaxRetry	5	The maximum number of retries to insert the code.
MaxResendRetry	3	The maximum number of emails sent.
MaxResendRetryIntervalSeconds	120	The interval between the sending of the emails.
ValidTimeIntervalMinutes	3	
Name	Sms	The channel.
RelatedEntityName	FTOS_BNKAP_RetailApplicantData	The entity.
RelatedAttribute	phone	The attribute from where the address is extracted and used to send the codes to.
LookupAttribute	FTOS_BNKAP_RetailApplicantDataid	
OTPDigitsNumber	4	The number of numbers of the code.
MaxRetry	5	The maximum number of retries to insert the code.
MaxResendRetry	3	The maximum number of SMSes sent.
MaxResendRetryIntervalSeconds	60	The interval between the sending of the SMS.
Name	Sms	The name.
RelatedEntityName	FTOS_BNKAP_RetailApplicantData	The entity.
maskNextStepURLFail	contactInfo	The step where the user is redirected if the insertion of the code has been unsuccessful.

Settings	Value	Description
maskNextStepURLSuccess	ProofOfIdentity	The step the user is redirected if the insertion of the code has been successful.
successStatus	ContactInfoValidated	The status if the insertion has been successful.
failedStatus	ContactInfoFailed	The status if the insertion has been unsuccessful.

Sliders_Parameters

In this solution, in the step "Simulation" on page 15, the customer uses the sliders form amount and period to select the sum of money needed for the loan and the time expressed in months the user wishes to pay back the loan. These are the settings for this digital flow settings.

simAmountSlider	
id	sliderAmount
amplitude	10000
relatedAttribute	loanAmount
handleId	handleAmount
unitOfMeasure	null
simPeriodSlider	
id	sliderPeriod
amplitude	15
relatedAttribute	period
handleId	handlePeriod
unitOfMeasure	months

The system uses the amplitude data, the minimum and maximum amounts & periods for each banking product. In the form driven flow named **FTOS_BARET_LoanSimulation**, in the **Simulation** step, in **After Events**, asynchronously a call is made to the internal endpoint, **FTOS_BARET_GetSlidersParameters** (see details "[FTOS_BARET_GetSlidersParameters](#)" on page 148). And lastly, the client script library **FTOS_BARET_LoanSimulationUtils** calls for the calculation of the **PMT**¹, calculating the total payment, taking into account: the loan amount, period and interest rate.

¹It calculates the monthly payment (principal and interest) required to settle a loan or an investment with a fixed interest rate over a specific time period.

Computer Vision & Face recognition & Liveness

The solution uses Onfido to verify the identity of a customer by scanning an ID (its front and back) to authenticate the document as in the step "[Know Your Customer](#)" on [page 27](#), it declares if the ID is authentic or fraudulent. Moreover, it compares the photograph taken from the ID document of the loan applicant and the "[Video Recording](#)" on [page 47](#) using AI and human experts to analyze biometric data points and declare the authenticity (the confidence score).

Computer Vision

Three digital flow settings were created for scanning ID documents:

Name	Flow Settings	Digital Processor Type	Source entity name
OCR_DrivingLicense	MobileLoan	OCR ¹	FTOS_BNKAP_RetailApplicantData
OCR_ID	MobileLoan	OCR	FTOS_BNKAP_RetailApplicantData
OCR_Passport	MobileLoan	OCR	FTOS_BNKAP_RetailApplicantData

The maximum number of retries for the scanning is 5 times for all types of documents.

OCR_DrivingLicense

Settings

Property	Value
SourceEntityName	FTOS_BNKAP_RetailApplicantData
MaxRetry	5
ShowTakePictureButton	true
ShowUploadPhotoButton	true
WaitUserConfirmation	true
OptionSets	

¹The employability of technology to recognize scanned documents.

Property	Value
OptionSetName	Gender Type
MappingName	Sex
OptionSetItems	
M	Male
F	Female
LookupEntities	
MappingName	DistrictCode
EntityName	District
AttributeKey	Code
MappingName	City
EntityName	City
AttributeKey	Name
Parent	
AttributeParentKey	DistrictId
MappingParentName	DistrictCode
Validations	
type	IdROM
Validations	V01,V05
CheckScriptName	ValidateIdROM
type	Passport
Validations	V05
CheckScriptName	ValidateIdPass
AvailableDocumentTypes	
type	IdRom
DocumentType	IdentityCard
Country	RO
Provider	Azure
type	IdBG
DocumentType	IdentityCard
Country	BG
Provider	Abbyy
type	Passport
DocumentType	MRZ
Provider	Azure
type	DrivingLicence
DocumentType	DrivingLicence
Provider	Azure
maskNextStepURLSuccess	

Property	Value
entity	FTOS_BNKAP_RetailApplicantData
form	FTOS_BNKAP_PersonalInfo
section	PersonalInfo
maskNextStepURLFail	
entity	FTOS_BNKAP_RetailApplicantData
form	FTOS_BNKAP_ScanID
section	ScanID
DocumentType	DrivingLicence

Mappings

The array `DocumentsMapping` contains:

type	DrivingLicence
Map	
PictureAttribute	pictureOcr
LastName	lastName
GivenName	firstName
DocumentNumber	IdCardSeries
StreetType	streetType
PersonalNumber	PIN
BirthDate	dateOfBirth
PlaceOfBirthBody	placeOfBirth
BirthCountryBody	birthCountry
Address	street
Sex	gender
DistrictCode	DistrictId
Nationality	citizenshipId
City	CityId
Street	StreetName
StreetNo	StreetNo
Storey	FloorNo
Stairway	Stairway
ApartmentNo	ApartmentNo
ApHouse	BuildingNo
IssuedBy	IdIssueInstitution
IssuedAt	IdIssueDate
IssuedUntil	IdExpirationDate
IssuingCountry	issuingCountry

OCR_ID

Settings

Settings	Value
SourceEntityName	FTOS_BNKAP_RetailApplicantData
DestinationEntityName	FTOS_BNKAP_RetailApplicantAddress
SourceEntityName	FTOS_BNKAP_RetailApplicantData
SourceLookupDestinationName	FTOS_BNKAP_RetailApplicantDataId
MaxRetry	5
ShowTakePictureButton	true
ShowUploadPhotoButton	true
WaitUserConfirmation	true
OptionSets	
OptionSetName	Gender Type
MappingName	Sex
OptionSetItems	
M	Male
F	Female
OptionSetName	Citizenship
MappingName	Nationality
OptionSetItems	
ROU	Romanian
GBR	UK
LookupEntities	
MappingName	DistrictCode
EntityName	District
AttributeKey	Code
MappingName	Country
EntityName	FTOS_CMB_Country
AttributeKey	code
Validations	
type	IdROM
Validations	V01,V05
CheckScriptName	ValidateIdROM
type	Passport
Validations,	V05
CheckScriptName	ValidateIdPass
AvailableDocumentTypes	
type	IdRom

Settings	Value
DocumentType	IdentityCard
Country	RO
Provider	Azure
type	IdBG
DocumentType	IdentityCard
Country	BG
Provider	Abbyy
type	Passport
DocumentType	MRZ
Provider	Azure
type	DrivingLicence
DocumentType	DrivingLicence
Provider	Azure
maskNextStepURLSuccess	
entity	FTOS_BNKAP_RetailApplicantData
form	FTOS_BARET_RetailApplicantDataMaster
section	Step1
maskNextStepURLFail	
entity	FTOS_BNKAP_RetailApplicantData
form	FTOS_BARET_RetailApplicantDataMaster
section	Step1
DocumentType	IdRom

Mappings

The array `DocumentsMapping` contains:

type	IdRom
Map	
PictureAttribute	pictureOcr
LastName	lastName
GivenName	firstName
DocumentNumber	IdCardSeries
StreetType	streetType
PersonalNumber	PIN
BirthDate"	dateOfBirth
PlaceOfBirthBody	placeOfBirth
Address	fullAddress
Sex"	gender

Nationality"	citizenshipId
Country	countryId
DistrictCode	districtId
City	cityName
Street	street
StreetNo	streetNo
Storey	floor
Stairway	stairway
ApartmentNo	apartmentNo
ApHouse	buildingNo
IssuedBy	IdIssueInstitution
IssuedAt	IdIssueDate
IssuedUntil	IdExpirationDate
IssuingCountry	issuingCountry

OCR_Passport

Settings

Settings	Value
SourceEntityName	FTOS_BNKAP_ RetailApplicantData
Entities	
DestinationEntityName	FTOS_BNKAP_ RetailApplicantData
SourceEntityName	FTOS_BNKAP_ RetailApplicantData
SourceLookupDestinationName	FTOS_BNKAP_ RetailApplicantDataid
MaxRetry	5
ShowTakePictureButton	true
ShowUploadPhotoButton	true
WaitUserConfirmation	true
OptionSets	
OptionSetName	Gender Type
MappingName	Sex
OptionSetItems	
M	Male

Settings	Value
F	Female
OptionSetName	Citizenship
MappingName	Nationality
OptionSetItems	
ROU	Romanian
GBR	UK
LookupEntities	
MappingName	DistrictCode
EntityName	District
AttributeKey	Code
MappingName	City
EntityName	City
AttributeKey	Name
Parent	
AttributeParentKey	DistrictId
MappingParentName	DistrictCode
Validations	
type	IdROM
Validations	V01,V05
CheckScriptName	ValidateIdROM
AvailableDocumentTypes	
type	IdRom
DocumentType	IdentityCard
Country	RO
Provider	Azure
type	IdBG
DocumentType	IdentityCard
Country,	BG
Provider	Abbyy
type	Passport
DocumentType	MRZ
Provider	Azure
type	DrivingLicence
DocumentType	DrivingLicence
Provider	Azure
maskNextStepURLSuccess	
entity	FTOS_BNKAP_ RetailApplicantData

Settings	Value
form	FTOS_BNKAP_PersonalInfo
section	PersonalInfo
maskNextStepURLFail	
entity	FTOS_BNKAP_RetailApplicantData
form	FTOS_BNKAP_ScanID
section	ScanID
DocumentType	Passport

Mappings

The array `DocumentsMapping` contains:

type	Passport
Map	
PictureAttribute	pictureOcr
LastName	lastName
GivenName	firstName
DocumentNumber	IdCardSeries
StreetType	streetType
PersonalNumber	PIN
BirthDate	dateOfBirth
PlaceOfBirthBody	placeOfBirth
BirthCountryBody	birthCountry
Address	fullAddress
Sex	gender
DistrictCode	DistrictId
Nationality	citizenshipId
City	CityId
Street	StreetName
StreetNo	StreetNo
Storey	FloorNo
Stairway	Stairway
ApartmentNo	ApartmentNo
ApHouse	BuildingNo
IssuedBy	IdIssueInstitution
IssuedAt	IdIssueDate
IssuedUntil	IdExpirationDate

IssuingCountry	issuingCountry
----------------	----------------

For more details, see [Computer Vision](#).

Onfido

Settings

These are the configurations done for Onfido.

Setting	Description	Attributes
FTOS_BNKAP_RetailApplicantData	Source entity.	LastName; FirstName; Email; WaitingForResponseTimeout; OptionSets;
maskNextStepURLFail	Next step in case of failure of the confidence score.	PersonallInfo
businessStatusSuccess	Next business status in case of success of the confidence score.	OCR Validation

Mappings

In this section, the array `DocumentsMapping` contains the properties type string mapped to the entity attributes where the values are stored.

Property	Entity attribute
PictureAttribute	pictureOcr
LastName	lastName
GivenName	firstName
DocumentNumber	IdCardSeries
StreetType	streetType
PersonalNumber	PIN
BirthDate	dateOfBirth
PlaceOfBirthBody	placeOfBirth
BirthCountryBody	birthCountry
Address	street
Sex	gender
DistrictCode	DistrictId
Nationality	nationality
City	CityId
Street	StreetNo
StreetNo	Street

Property	Entity attribute
Storey	FloorNo
Stairway	Stairway
ApartmentNo	Apartment
ApHouse	BuildingNo
IssuedBy	IdIssueInstitution
IssuedAt	IdIssueDate
IssuedUntil	IdExpirationDate
IssuingCountry	issuingCountry
Confidence	confidence

For more details, see [Onfido Integration](#).

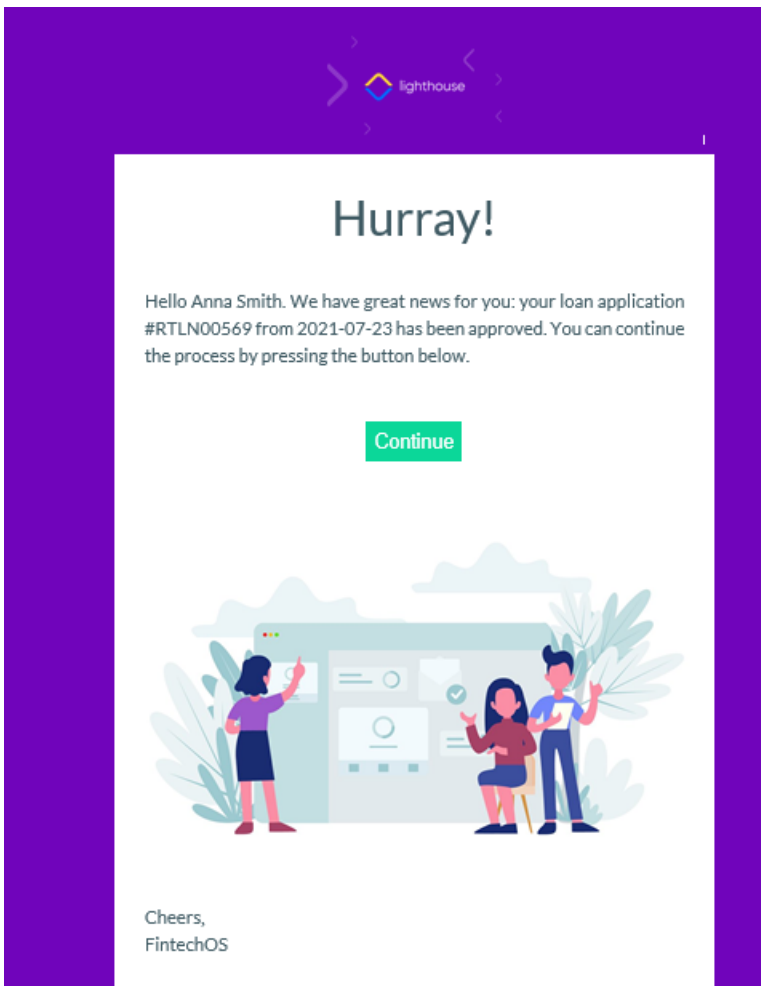
Email & SMS Generation

Email

Five emails are sent in this flow:

- informing the customer that the loan has been approved
It is executed using ["FTOS_BARET_FinancialCalculations"](#) on page 152.
- informing the customer that the loan has been denied
It is executed using ["FTOS_BARET_FinancialCalculations"](#) on page 152.
- sending the documents for further reading
It is executed using ["FTOS_BARET_SendMailApplicationDocuments"](#) on page 156.
- sending the documents signed
It is executed using ["FTOS_BARET_SendMailApplicationDocumentsSigned"](#) on page 156.
- referring a friend.
It is executed using ["FTOS_BNKAP_SendReferralEmail"](#) on page 150.

The emails are configured by running the server scripts. For the script, open the FintechOS Studio, click **Advanced** -> **Server Automation Scripts**.



The content of the emails is created with email templates. Open the FintechOS Studio, click **Admin** -> **Email templates**. Edit as you need. To modify the look and feel of any of the emails, access its corresponding template. The email templates are:

Template	Step
LoanApproved	"Application Result" on page 59
LoanDocuments	"Signature of Documents" on page 67
LoanRejected	"Application Result" on page 59
ResetPasswordEmail	"Contact Info" on page 23
FriendReferral	"Congratulations & Feedback" on page 72

SMS

The SMSes are used in two steps of the flow: "Contact Info" on page 23 and "Signature of Documents" on page 67.

Validations

Within the FintechOS Studio, there are Server Scripts which execute several actions which embody a business need such as: filtering products, returning products and setting amounts or periods. On-demand automation scripts are available for being called from any object or context. Here is a list of the scripts used in this solution.

Server Automation Script Libraries

Library	Script
FTOS_BNKAP_ RetailLoanFinancialCalculations	It contains the scripts: <ul style="list-style-type: none"> • FTOS_BARET_FinancialCalculations • FTOS_BARET_ FinancialCalculationsAsync.
FTOS_BARET_CrossSellingUtils	It contains the scripts: <ul style="list-style-type: none"> • FTOS_BARET_isEligibleForCreditCard • FTOS_BP_GetCreditCards.
FTOS_BP_ChangeStatus_ PaymentScheduleType	

Library	Script
FTOS.BP_ CALC.FormulaEngineHelper	<ul style="list-style-type: none"> • FTOS_BP_CallFormula • FTOS_BP_Formula_BeforeInsert Event trigger • FTOS_BP_Formula_BeforeUpdate • FTOS_BP_Formula_ CreateDataMapping • FTOS_BP_GetCommissionDetail • FTOS_BP_GetDiscountDetail • FTOS_BP_GetInsuranceDetail • FTOS_BP_GetInterestDetail • FTOS_BP_TestCallFormula

Library	Script
FTOS.Utils	<ul style="list-style-type: none"> • AfterInsert_FTOS_CB_ AllocationMethodDetail • FTOS_BP_BankingProductDiscount_ BlockOverlapIntervall • FTOS_BP_BankingProductDiscount_ BlockOverlapIntervalU • FTOS_BP_ BankingProductDocument_ Validation_BeforeI • FTOS_BP_ BankingProductDocument_ Validation_BeforeU • FTOS_BP_CommissionValue_ BlockOverlapIntervall • FTOS_BP_CommissionValue_ BlockOverlapIntervalU • FTOS_BP_InsuranceItem_ BlockOverlapIntervalU • FTOS_BP_InsuranceValue_ BlockOverlapIntervall • FTOS_BP_InsuranceValue_ BlockOverlapIntervalU • FTOS_BP_InterestCommissionItem_ BlockOverlapIntervalU • FTOS_BP_InterestValue_

Library	Script
	<ul style="list-style-type: none"> BlockOverlapIntervall • FTOS_BP_InterestValue_ BlockOverlapIntervalU • FTOS_BP_Simulate • FTOS_BP_Versioning_InsertBefore • FTOS_BP_Versioning_UpdateAfter • FTOS_CheckLicense • FTOS_DFP__OTP_MakeAttempt • FTOS_DFP_ GenerateAndSendOTPChannel • FTOS_DFP_GenerateOTP On demand • FTOS_DFP_OCR_CheckPhoto On demand Insert Before • FTOS_DFP_OTP_ ResendOTPChannel On demand • FTOS_DFP_OTP_SetChannelFailed
<p>FTOS_B2CSession</p>	<ul style="list-style-type: none"> • FTOS_BARET_AfterInsert_ LinkApplicantData • FTOS_BARET_FinancialCalculations • FTOS_BARET_ FinancialCalculationsAsync • FTOS_BARET_ SendMailApplicationDocuments

Library	Script
FTOS_BARET_CrossSellingUtils	<ul style="list-style-type: none"><li data-bbox="824 296 1305 327">• FTOS_BARET_isEligibleForCreditCard<li data-bbox="824 365 1166 396">• FTOS_BP_GetCreditCards

Library	Script
FTOS_BP_BankingProductHelper	<ul style="list-style-type: none"> • FTOS_BARET_ GenerateLoanDocuments • FTOS_BARET_ GetAvailablePricingProducts • FTOS_BARET_ GetAvailableProductsAvailabilityData • FTOS_BP_ GetAvailableProductDiscounts • FTOS_BP_GetAvailableProducts • FTOS_BP_GetAvailableProductsExtra • FTOS_BP_GetCommissionDetail • FTOS_BP_GetDiscountDetail • FTOS_BP_GetInsuranceDetail • FTOS_BP_GetInterestDetail • FTOS_BP_GetProductInsuranceList • FTOS_BP_ GetProductInterestCommissionList • FTOS_BP_GetProductType • FTOS_BP_GetScheduleFields • FTOS_BP_ SetBankingProductCommissionRules • FTOS_BP_ SetBankingProductInsuranceRules

Library	Script
	<ul style="list-style-type: none"> • FTOS_BP_ SetBankingProductInterestRules • FTOS_BP_Simulate • FTOS_CB_ CountQuestionsOnProduct • FTOS_CB_GetQuestionsOnProduct • FTOS_Loan_GetAgeFilter
FTOS_BP_ BankingProductValidationHelper	FTOS_BP_BankingProduct_BU_Validations
FTOS_CheckExistingClientHelper	FTOS_ACC_Account_Before_Insert
FTOS_DCS_Liveness	<ul style="list-style-type: none"> • FTOS_DCS_Liveness_Check • FTOS_DCS_Liveness_GetKeys • FTOS_DCS_Liveness_SessionToken
FTOS_DFP_OTP_Utills	<ul style="list-style-type: none"> • FTOS_DFP_OTP_MakeAttempt • FTOS_DFP_ GenerateAndSendOTPChannel • FTOS_DFP_InsertNewOTP • FTOS_DFP_OTP_ ResendOTPChannel • FTOS_DFP_OTP_SetChannelFailed • FTOS_DFP_OTP_ SetFailedOTPChannel
FTOS_FlowSettings_Utills	FTOS_GetFlowSettings_ ByLoanIdAndDigitalProcessor

Library	Script
FTOS_Onfido_Integration	<ul style="list-style-type: none"> • FTOS_Onfido_CreateCheck_Full • FTOS_Onfido_Full • FTOS_Onfido_VerifyChecksForCurrentApplicant • FTOS_Onfido_VerifyCheckStatusById • FTOS_Process_Onfido_Webhook

Server automation Scripts

Script	Type
FTOS_BNKAP_CheckIfIsCustomer	On demand
FTOS_BNKAP_CheckIfIsInBlacklist	On demand
FTOS_BNKAP_GetIntervalAge	On demand
FTOS_BNKAP_SaveConsentsTimestamp	On demand
FTOS_BNKAP_SaveGDPRConsentTimestamp	On demand
FTOS_BNKAP_SelectOffer	On demand
FTOS_BNKAP_SendReferralEmail	On demand
FTOS_BNKAP_ValidateReferral	On demand
FTOS_BARET_AccountApplication_BusinessWorkflow	On demand
FTOS_BARET_AddFeedback	On demand
FTOS_BARET_AgreeLoanDocument	On demand

Script	Type
FTOS_BARET_CalculatePMT	On demand
FTOS_BARET_FilterAvailableProductsAmountAndPeriod	On demand
FTOS_BARET_FinancialCalculations	On demand
FTOS_BARET_FinancialCalculationsAsync	On demand
FTOS_BARET_GenerateLoanDocuments	On demand
FTOS_BARET_GetApplicantData	On demand
FTOS_BARET_GetApplicationDocuments	On demand
FTOS_BARET_GetAvailablePricingProducts	On demand
FTOS_BARET_GetAvailableProductsAvailabilityData	On demand
FTOS_BARET_GetChooosedPricing	On demand
FTOS_BARET_GetChooosedPricingDetails	On demand
FTOS_BARET_GetDestinationDataById	On demand
FTOS_BARET_GetDTI	On demand
FTOS_BARET_GetLoanDestinationTiles	On demand
FTOS_BARET_GetNoOfOpenRequestsByPIN	On demand
FTOS_BARET_GetSlidersParameters	On demand
FTOS_BARET_isEligibleForCreditCard	On demand
FTOS_BARET_LoanChangeStatus	On demand
FTOS_BARET_MaxOfferCalculation	On demand
FTOS_BARET_Scoring	On demand
FTOS_BARET_SelectSingleRequest	On demand

Script	Type
FTOS_BARET_SendMailApplicationDocuments	On demand
FTOS_BARET_SendMailApplicationDocumentsSigned	On demand
FTOS_BARET_SetChosenProduct	On demand
FTOS_BARET_SetLoanAmountAndPeriod	On demand
FTOS_BARET_SetPaymentDay	On demand

FTOS_BNKAP_CheckIfIsCustomer

This script checks in the system if the customer is an existing customer based on the PIN.

HINT

To achieve this, the script checks in the entity [Account](#) if the customer is already existing and saves the value in [FTOS_BNKAP_RetailApplicantData](#) in the attribute [isExistingCustomer](#).

Input: retailApplicant

Output: array checkCustomer.

FTOS_BNKAP_CheckIfIsInBlacklist

This script checks if the customer is blacklisted.

HINT

To achieve this, the script checks in the entity [FTOS_BNKAP_RetailApplicantData](#) in the attribute [isInBlacklist](#) if the customer is blacklisted.

Input: N/A

Output: array checkCustomerBlack.

FTOS_BNKAP_GetIntervalAge

This script checks to see if the age of the applicant is in the interval of 18 to 65. This script is used after the step ["Know Your Customer"](#) on page 27.

Input: age, minAge = 18; maxAge = 65; isNotInRange

Output: sets the string isInAgeInterval

FTOS_BNKAP_SaveConsentsTimestamp

This script saves the time when the consents were given. This script is used in the step ["Consents"](#) on page 50.

Input: agreeTerms, agreeNationalTaxation, agreeCreditBureau

Output: time: now if user agreed to consents, else display the message *Agreement not accepted.*

FTOS_BNKAP_SaveGDPRConsentTimestamp

This script saves the time when the consents were given. This script is used in the step ["Contact Info"](#) on page 23.

Input: agreed

Output: time: now if user agreed to consent, else display the message *Agreement not accepted.*

FTOS_BNKAP_SelectOffer

This script updates the pricing and loan entities with the calculated values after selecting an offer. This script is used for the step ["Product Selection"](#) on page 17.

Input: pricingId; maxInstallment

Output: Js

FTOS_BNKAP_SendReferralEmail

This script sends the email with the referral to an email address inserted by

the customer to refer a friend. This script is used in the step "Congratulations & Feedback" on page 72.

Input: email; referralId; applicantDataId;

Output: the function `sendMailNoEx` is executed.

FTOS_BNKAP_ValidateReferral

This script validates the referral. This script is used in the step "Congratulations & Feedback" on page 72.

Input: referralId

Output: N/A

FTOS_BARET_AccountApplication_BusinessWorkflow

This script sets the status of the application of a customer: Initialized; OCR in Progress; Face Recognition in Progress; Video Call in Progress; Contract Signed.

Input: accountApplicationId; toStatus businessStatusInitialized;

Output: N/A

FTOS_BARET_AddFeedback

This script inserts the rating given by the customer at the end of the flow. This script is used in the step "Congratulations & Feedback" on page 72.

Input: rating; sourceId; applicationId;

Output: array `p`

FTOS_BARET_AgreeLoanDocument

This script updates the approval of the customer to the document. This script is used in the step "Signature of Documents" on page 67.

Input: applicationDocumentId; value;

Output: var `agreed`

FTOS_BARET_CalculatePMT

This script calculates the monthly payment, based on the loan amount and the duration. This script is used in multiple steps such as ["Simulation"](#) on [page 15](#).

Input: `monthlyPayment`; `duration`; `amount`; `interest`;

Output: var `monthlyPayment`

FTOS_BARET_FilterAvailableProductsAmountAndPeriod

This script filters the products based on the selected amount and period. This script is used for the step ["Product Selection"](#) on [page 17](#).

Input: `applicationId`; `amount`; `period`; `maxProductsDisplayed`;

Output: array `res`

FTOS_BARET_FinancialCalculations

This script simulates the async with ANAF and Credit Bureau. This script is used for the step ["Application Result"](#) on [page 59](#)

Input: `loanId`; `applicantDataId`;

Output: var `financialAnaysis`

FTOS_BARET_FinancialCalculationsAsync

This script calculates the finance for the applications with the business status `SubmittedForReview`. This script is used in the step ["Submit Application"](#) on [page 54](#).

Input: array `loans` (with at least one element)

Output: var `financialAnaysis`

FTOS_BARET_GenerateLoanDocuments

This script generates the loan documents. This script is used in the step "Signature of Documents" on page 67.

Input: applicationId

Output: array `data`.

FTOS_BARET_GetAvailablePricingProducts

This script filters the products based on the amount and period and destination type id.

Input: amount; period; applicationId.

Output: array `res`

FTOS_BARET_GetAvailableProductsAvailabilityData

This script saves the available product details into Pricing.

Input: applicationId; productDestTypeId; loanId; date.

Output: array `bpRes`

FTOS_BARET_GetChoosedPricing

This script returns the best offer (banking product) to the customer. This script is used in the step "Application Result" on page 59.

Input: loanId

Output: array `pricingData`

FTOS_BARET_GetChoosedPricingDetails

This script returns the details about the banking product.

Input: applicationId

Output: array `res`

FTOS_BARET_GetDestinationDataById

This script returns the destination data based on its ID.

Input: destinationId

Output: array `res`.

FTOS_BARET_GetDTI

This script returns the **DTI**¹.

Input: financialDataId

Output: array `financialData`

FTOS_BARET_GetLoanDestinationTiles

This script returns the loan destination. This script is used in the step ["Welcome screens" on page 10](#).

Input: des; type;

Output: array `statements`

FTOS_BARET_GetNoOfOpenRequestsByPIN

This script returns the number of applications filtering them via the personal identification number.

Input: L; RAD.

Output: array `noOfRows`

FTOS_BARET_GetSlidersParameters

This script returns the values for the sliders. This script is used in the step ["Simulation" on page 15](#).

¹The Debt-to-Income ratio (DTI) is a personal indicator of a good balance between debt and income. Monthly debt payment amount / Monthly gross amount (before taxes and other deductions).

Input:

Output: var `parsedSettings`

FTOS_BARET_isEligibleForCreditCard

This script calculates whether the customer is eligible financially for a credit card. This script is used for the step ["Credit Card"](#) on page 65.

Input: var `pricingDetails`

Output: boolean `isEligible`

FTOS_BARET_LoanChangeStatus

This script changes the status of the loan. This script is used in multiple steps.

Input: `loanId`; `status`.

Output: var `status`

FTOS_BARET_MaxOfferCalculation

This script calculates the maximum offer for a customer. This script is used in the step ["Application Result"](#) on page 59.

Input: `interestRate`; `monthlyPaymentsForCreditLimits`; `tenor`; `income`; `maxDTI`; `otherInstallments`;

Output: array `res`

FTOS_BARET_Scoring

This script calculates the scoring.

Input: `applicantDataId`; `loanId`.

Output: var `scoringDecision`

FTOS_BARET_SingleRequestRequest

This script checks to the applications with the statuses `new`, `contactInfo`, `data`,

consents, completed, review, approved, docs for the same person (same PIN) and moves them all to the status CanceledByCustomer.

Input: PIN; loanId.

Output: N/A

FTOS_BARET_SendMailApplicationDocuments

This script sends the email with the application documents. This script is used in the step "[Signature of Documents](#)" on [page 67](#).

Input: applicantDataId; loanId; applicationId;

Output: boolean `manuallySign`

FTOS_BARET_SendMailApplicationDocumentsSigned

This script sends the email with the application documents signed by the customer. This script is used in the step "[Signature of Documents](#)" on [page 67](#).

Input: applicantDataId; loanId; applicationId;

Output: N/A

FTOS_BARET_SetChosenProduct

This script updates the loan with the default banking product.

Input: loanId; productId; applicationId; pricingId;

Output: string `message`

FTOS_BARET_SetLoanAmountAndPeriod

This script updates the amount and period. This script is used in the step "[Simulation](#)" on [page 15](#).

Input: loanId; loanAmount; period.

Output: var loanAmount; period

FTOS_BARET_SetPaymentDay

This script sets the payment day of installments. This script is used in the step "Choose Installment Payment Date" on page 63.

Input: chosenDate; finalDate.

Output: var finalDate.

ANAF & Credit Bureau Integration

A customer applying for a loan has to be checked by the bank to see whether they can take on their loan based on financial information. This information is found within two institutions which hold such data. The **ANAF**¹ and **Credit Bureau**² databases are queried to return a result used in "Application Result" on page 59. The following on-demand scripts call an endpoint with the same name:

HINT

For this solution, the integration is not fully functionally, only simulated to return a random number for the income and sets the active loans to 1 loan.

FTOS_BNKAP_ANAFInsert

This script inserts randomly an income value for each applicant. It adds randomly data in the FTOS_BNKAP_RetailIncomeData and aggregates all data in FTOS_BNKAP_RetailFinancialData

Input: applicantId

¹Agencia Națională de Administrare Fiscală (ANAF) It is the specialized body of the central public administration in Romania. It has its own legal persona, by detaching the directions with attributions in the administration of the state revenues within the Ministry of Public Finance. It ensures the resources for the public expenses of the state by collecting and administering effectively and efficiently the taxes, taxes, contributions and other amounts due to the general consolidated budget.

²The Credit Bureau aims to support the participants in the system by providing real, up-to-date and consistent information regarding individuals who have taken loans from banks or financial companies, purchased a product under a leasing system or have been insured against the risk of non-payment by an insurance company.

Output: updates in the entity FTOS_BNKAP_RetailFinancialData the incomeDeclared

FTOS_BNKAP_BOInsert

This script inserts the value 1 as active loan for a client. It adds randomly data in the FTOS_BNKAP_RetailLoansData and aggregate all data in FTOS_BNKAP_RetailFinancialData

Input: applicantId

Output: updates in the entity FTOS_BNKAP_RetailFinancialData the activeLoansNo as 1.

Glossary

A

ANAF

Agenția Națională de Administrare Fiscală
(ANAF)

It is the specialized body of the central public administration in Romania. It has its own legal persona, by detaching the directions with attributions in the administration of the state revenues within the Ministry of Public Finance. It ensures the resources for the public expenses of the state by collecting and administering effectively and efficiently the taxes, taxes, contributions and other amounts due to the general consolidated budget.

APR

Annual percentage rate. APR is an annualized representation of your interest rate.

Available DTI

It represents the additional monthly payment that the applicant could pay, until the borrower reach the maxDTI defined at a bank level.

C

Credit Bureau

The Credit Bureau aims to support the participants in the system by providing real, up-to-date and consistent information regarding individuals who have taken loans from banks or financial companies, purchased a product under a leasing system or have been insured against the risk of non-payment by an insurance company.

D

DTI (Debt-to-income)

The Debt-to-Income ratio (DTI) is a personal indicator of a good balance between debt and income.

Monthly debt payment amount / Monthly gross amount (before taxes and other deductions).

E

Effective interest rate

The effective annual interest rate is the real return paid on savings or the real cost of a loan as it takes into account the effects of compounding and any fees charged.

F

FEIS

The European Fund for Strategic Investment (EFSI) is an initiative launched jointly by the European Investment Bank Group – the European Investment Bank and European Investment Fund and the European Commission to help overcome the current investment gap in the EU. EFSI is one of the three pillars of the Investment Plan for Europe that aims to revive investment in strategic projects around the continent to ensure that money reaches the real economy.

FICO score

The FICO score is an algorithm used internationally, mainly by banks, to determine the degree of risk for a person who applies for a loan, and is collected by the Credit Bureau.

G

Gamification

The application of typical elements of game playing (e.g. point scoring, competition with others, rules of play) to other areas of activity, typically as a technique to encourage engagement with a

product or service.

GDPR

The General Data Protection Regulation is a regulation in EU law on data protection and privacy in the European Union and the European Economic Area.

I

IBAN

International Bank Account Number

Interest Rate

The interest rate is the amount a lender charges a borrower and is a percentage of the principal—the amount loaned.

K

KYC

Know Your Customer is the process of verifying the identity of a client, in order to avoid the potential risks of illegal intentions, like fraudulent usage of another person's online identity.

O

OCR

The employability of technology to recognize scanned documents.

OTP

One-Time-Password. It is a password generated by the system to validate a piece of information or sign a document.

P

PMT

It calculates the monthly payment (principal and interest) required to settle a loan or an investment with a fixed interest rate over a specific time period.

Q

QR code

A QR code (abbreviated from Quick Response code) is a type of matrix barcode (or two-dimensional barcode).