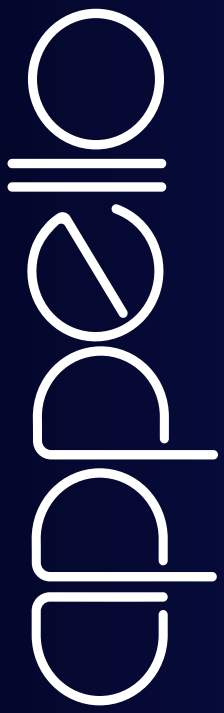

DIGITAL
LENDING PLATFORM

AppDP is our own framework that significantly shortens the introduction time of new processes and products.ApPello AppDP is a constantly evolving tool that functions as a technology framework for ApPello business applications. The goals of the platform are rapid development, easy and seamless integration into the banking environment, and favourable long-term sustainability of applications.

1. MANAGEMENT **SUMMARY**

The most outstanding advantages of the platform are the flexibility and the simple parameterization, which allows the changes in the banking needs to be incorporated into the application without the need for code changes, simply with the appropriately authorized user's parameterization. (For example, the scope of data to be recorded will be expanded; or additional operations or tasks will need to be integrated into an existing process; or new rules will have to be implemented in accordance with changes in legislation, new policies.)

This high degree of flexibility not only allows rapid adaptation to changes, but also leads to cost efficiency and supplier independence.

During the implementation, the business need and the data model are modelled using a UML tool (Enterprise Architect) and then uploaded into the system. Data model user interfaces, business logic and processes stored in rule engine can be modified with Drag & Drop editor without the help of developer involvement.

ApPello places great emphasis on improving user experience, developing its technology and on continuous innovation. Therefore, ApPello provides the AppDP platform with the most advanced external components available on the market.

The purpose of the document is to describe ApPello's Development Platform (AppDP), its main characteristics and advantages.

ApPello's principle is developing user-focused solutions that do not only meet the business requirements, but can be set by the end users without IT involvement. ApPello puts a big emphasis on the digitalization in the loan processes led by the latest customer expectations.

The digital platform is the basis of ApPello solutions that includes features common to all modules: flexible screen management, database connectivity, multichannel capabilities, and so on. ApPello has developed and used a digital platform for the following reasons:

- easy to configure processes which can easily be tracked, changes can be made quickly without the help of a costly programmer
- drag & drop screens editable, new products, regulatory compliance changes made easy
- database fields can be added to the system without any programming experience, it means fitting the system to the Banks's collateral catalogue can be done within 2 weeks,
- and, last but not least, with the help of the platform, business logic has been put into the „Rule Engine", which means that almost nothing is fixed steadfast; business leaders have so-called business rules, i.e. eligibility rules, enforceability criteria, can be modified any time. Yet, using the same set of rules, administrators can set permissions of fields on a screen.

"ApPello truly believes that the innovative product approach plus the up-to-date technology provided by ApPello is a combination that provides a forward-looking, long-term solution fitting business needs.

BÉLA VÉR, CEO

2. INTRODUCTON TO **APPELLO DIGITAL PLATFORM**

AppDP is our own framework that significantly shortens the introduction time of new processes and products.

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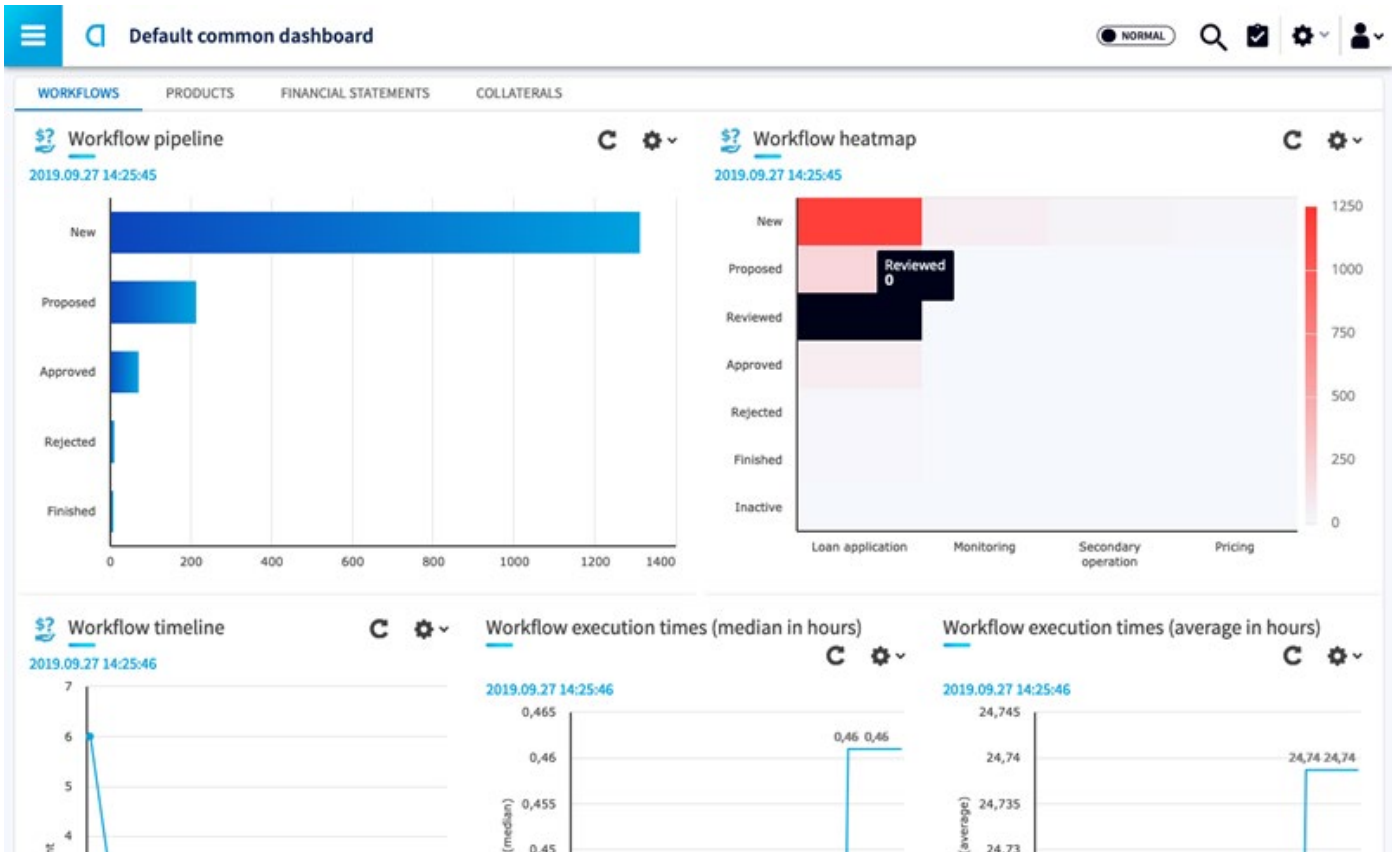
Dashboard Screen



2.1 PLATFORM
INTERFACE

After logging into the applications developed by ApPello, a so-called Dashboard page will open first. Dashboard screens usually include graphs for quick information to users, their to-do list, and a so-called notice board which can be customized depending on their level of authorization.

The dashboard can be used for executive summaries or as a starting page for administrators. It allows individual users to select different dashboard items from the role-based panel list and create their own overview page.

The following is a detailed description of the features that provide a great user experience provided by the platform.

Dynamic menu system: The right of visibility of menu items can be parameterized. Any information from the menu system can be accessed with a few clicks. According to the latest trends, any navigation interface can be configured under the full-screen hamburger menu.

Breadcrumb menu, headers, colour icons, left-hand menu bar (with icons): easy-to-navigate features. In order to allow the user to clearly identify what kind of data they are seeing for a particular real estate, on a single page. The former is provided by headers, while under the left-hand menu enables advanced features such as commenting, workflow steps, or changing credit history for a particular loan application.

This menu structure contains breadcrumbs for navigation purposes. The data highlighter component is visible below which constantly displays the most important data for back-office users.

Data Highlighter Component: When designing pages, it is possible for the user to display the most important information (user Id, data update status, etc.), which is constantly updated and can be displayed anywhere on the page as a separate page component.

Design Customizability: The application allows you to set the desired design as a system parameter. ApPello delivers the product with our latest design set, however the client always has the choice of requesting customization (brand colors, logos, company fonts).

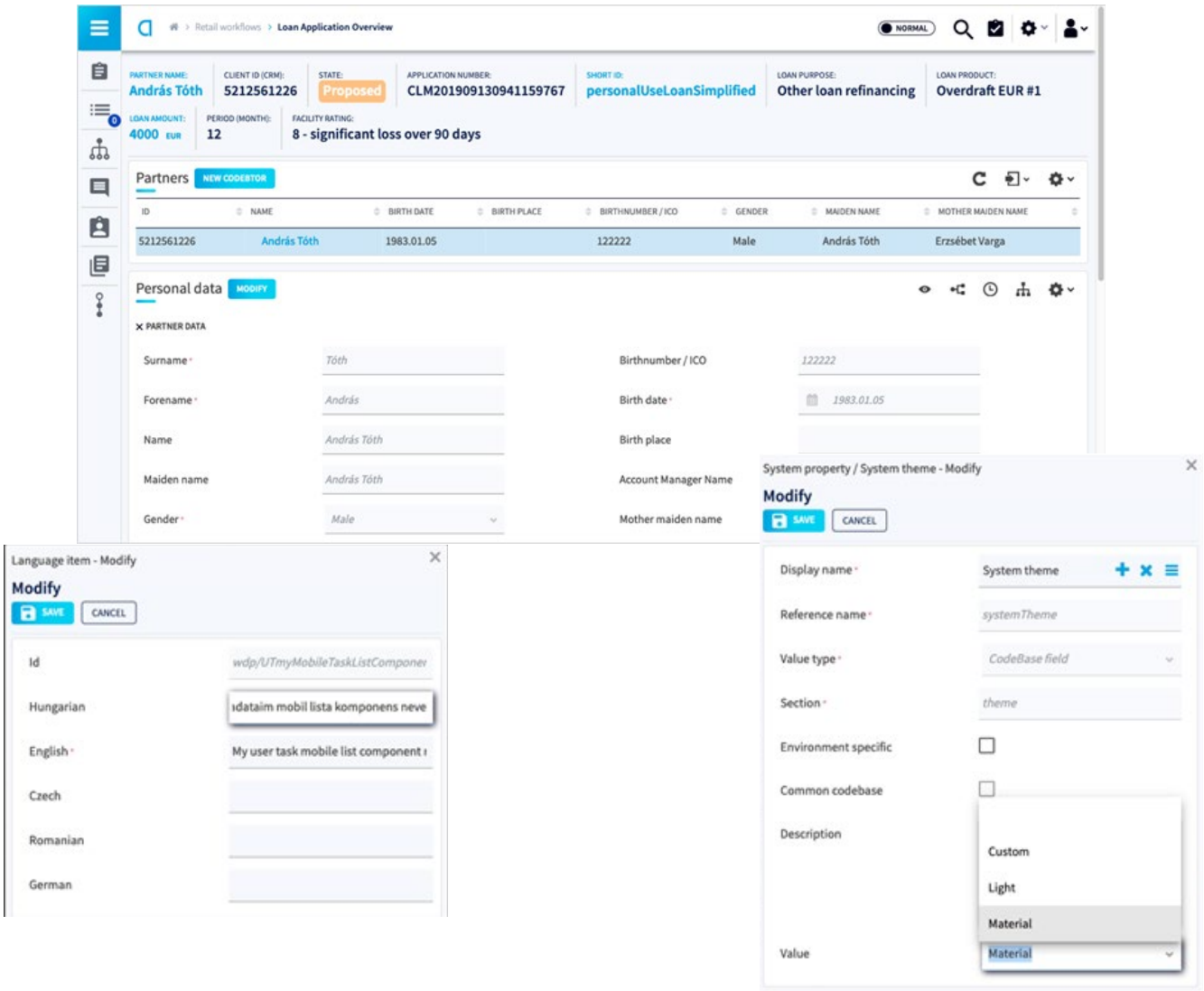
Dynamic Menu

Multiple languages: All text visual elements (eg labels, menus, value sets) in the application are saved as so-called language elements in the application. When creating language elements, it is possible to specify several different values (languages). The solution allows you to predefine the languages to be used and from then on, the bank is able to maintain its multilingual products independently.

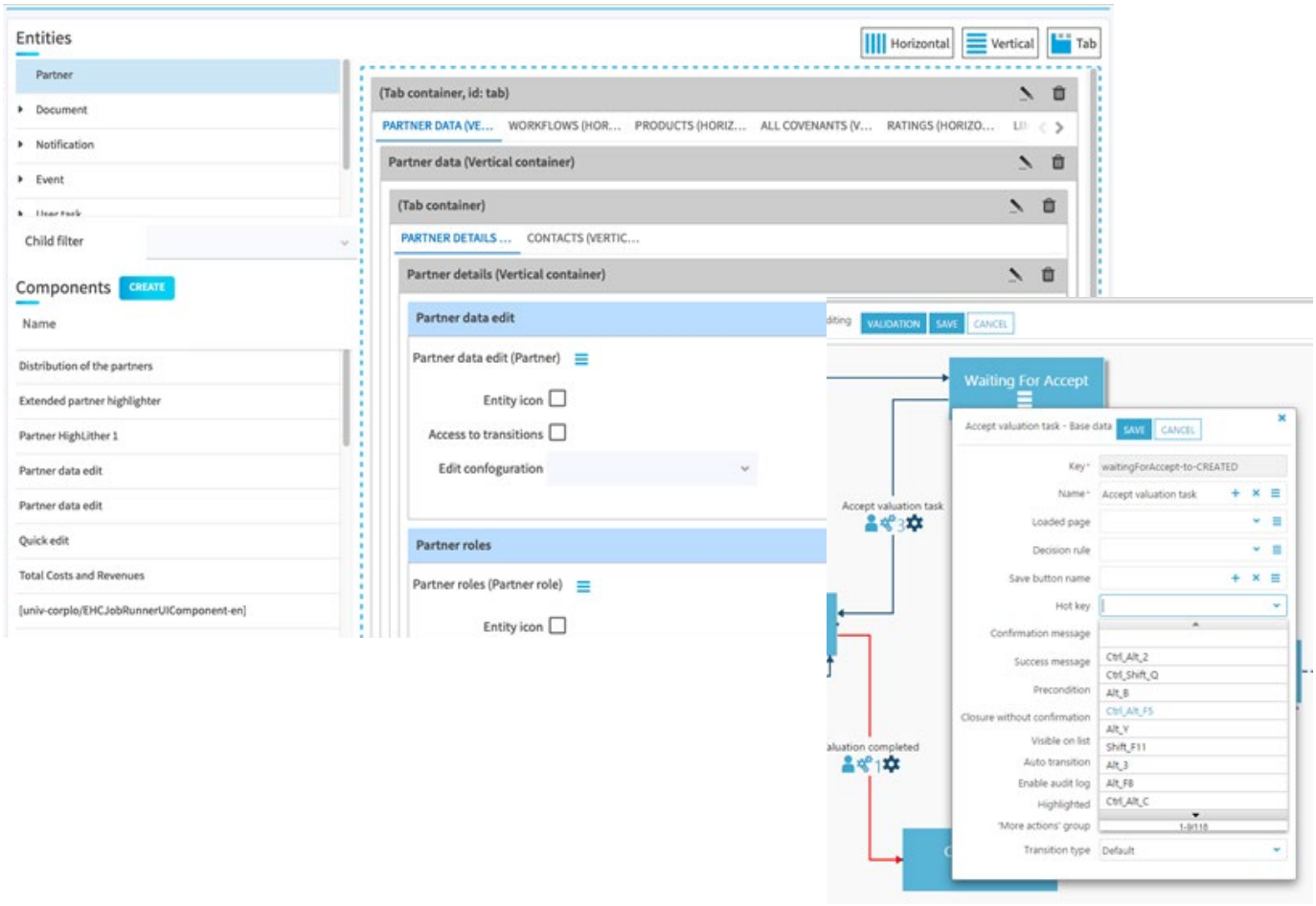
The system is able to handle multiple language options simultaneously. One default language must always be set up initially; other values can be added later at any time.

Customizability, User Profile Setting: The user has the ability to customize the application in a limited way. For example, they have the option to change the order of columns on list pages,

Loan application overview, Application theme, Multiple language support



Data block management, Setting up shortcuts to various buttons



to change the sorting order of lists, but these user editing options and saving changes are subject to authorization. In addition, there is the possibility of further customization, such as setting the application's language. However, for an already identified and logged in user

Shortcuts, tabs: Any button implemented in the application can be assigned to a hotkey, and tabs allow users to navigate through each screen in a pre-defined order.

to automatically save the user customizations they make, minor development involvement is required.

Tabs and data block management: It is possible to use different data blocks, tabs on the data display and data recording pages of the application. The Platform Screen Builder allows the user to build pages from various storages (Tab Storage, Tabs, Horizontal Storage, Vertical Storage) and to place page components (data blocks) in these storages.

2.2 AUTHORIZATION **MANAGEMENT**

Authorization management is a key feature, as each user can only see / edit the menu, function, screen, field that they have permission to access. This allows the user to see no more than they need to thus preventing unauthorized access.

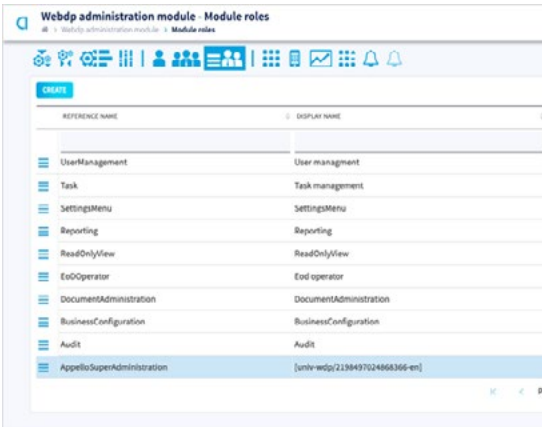
Multiple levels of data access have been implemented in our system, since the functions that can be performed on the entities created in the application can be defined by each module as module roles, which then, can be further restricted by so-called data access rules.

The roles created by each module can be grouped at the system level into so-called system roles, which are eventually assigned to users.

Further development framework abilities related to authorization:

- Integrated user authentication and authorization
- Single Sign-on ability
- Four (or more)-Eye Principle
- Audit logging

Maintaining module roles



2.3 LOGICAL **ARCHITECTURE**

Our systems are built on usual application layers. The most important element is separating the business logic from display, as well as separating the persistence layer from the actual database. Connection to external systems is possible through the integration interface.

2.3.1 Modularity

Every ApPello system possesses a modular structure. Each ApPello system is built on the AppDP platform, which is a module on its own within the delivered system. This provides the parameterability of the business module based on it, as well as the specific expansion. The system includes basic modules that are used uniquely by each ApPello system, but the services are created in AppDP, such as: Report generating, Entity handling, Screen Parameterization, Business Rule Evaluation, etc.

2.4 ENTERPRISE ARCHITECT
UML MODELING

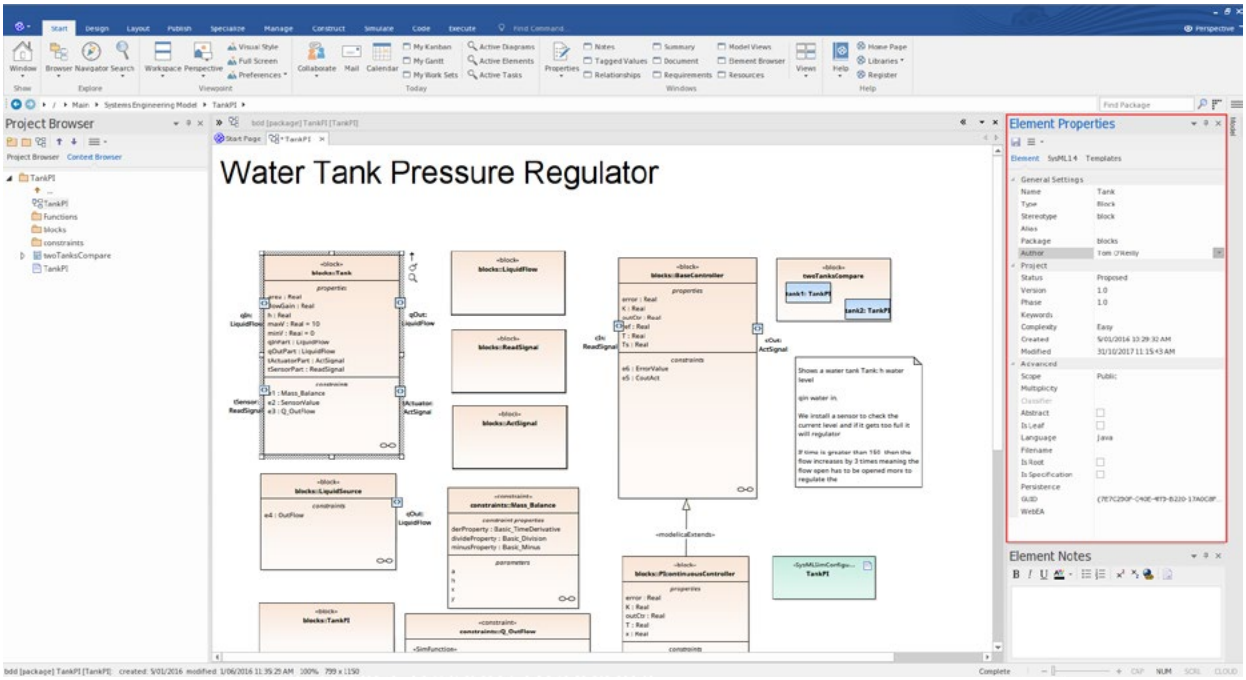
The applications developed in ApPello ApPDP are based on the handling of business entities. Entities are business definitions that include closely related concepts, features (fields), rules, pages, and the life cycle of entities. Examples of such entities are „Clients", „Loans", „Collateral", etc.

These entities have attributes such as data describing them, i.e. the fields. (For example: „Name of Client"; „Credit Amount"; „Collateral Type".

Entities can be used to create sub-entities that inherit all the properties of the parent entity, and later certain attributes can be changed, deleted, or created. Entities are, of course, sub-entities that can be parent entities at an even lower level.

The relationship between the entity model and entities, as well as the data describing them - is generated by ApPello's highly qualified business analysts using the UML tool of Enterprise Architect. After approval, the entity model is scanned by AppDP and automatically generates the desired entities including every data entered into EA. If further data has to be added to the entity model, the structure must be modified and then generated in Enterprise Architect.

UML Modelling Interface – 3rd party modelling application



2.5 SCREEN **BUILDER**

One of the key elements of the flexibility toolbar is the Screen Builder, which enables professional financial firm employees, with the right knowledge, to create different types of completely different screens (eg forms, lists, graphs), to customize fields, calculations, validations and to define default values. For example, the same page may look completely different if the customer segment or transaction type is different, or if a field is filled in with a different value or if another user views that page.

In this way, it is very easy to display new information (fields) or to change the business logic (e.g.: calculations) on the screen, which are among the most common change requests after a new application is installed. Since these steps can be performed by the Bank's/Financial Enterprise's IT experts or even by power users. It is therefore possible to add or modify the application without the assistance of the vendor.

A Screen Builder's main advantages

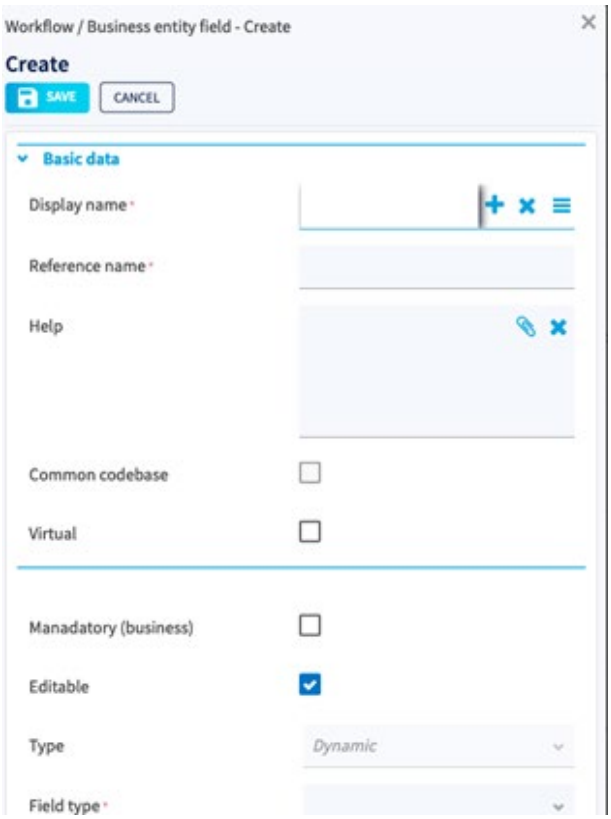
- Easily customizable, adjustable screens.
- Intelligent, customizable field types.
- Ability to add new fields.
- Selecting where new fields should be
- Automatic validations, flexible error handling.
- Any changes will be activated and can be utilized immediately.

Creating Fields

The system allows a suitably qualified and authorized user to add a completely new data field that can be instantly displayed on forms and lists. Setting a default value, creating a calculation or validation rule right away is also possible.

In the example below, ApPello created a new integer type field, made it editable and gave a default value, then set a validation rule for the number (can be between 100,000 and 10,000,000). If the user does not follow any rules when giving values, an error message is automatically generated and input is not possible.

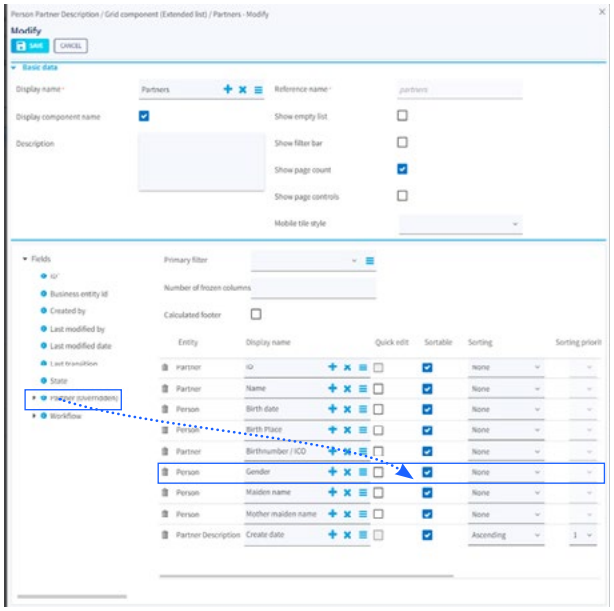
Adding a new field following the definition of a validation logic



Editing Pages

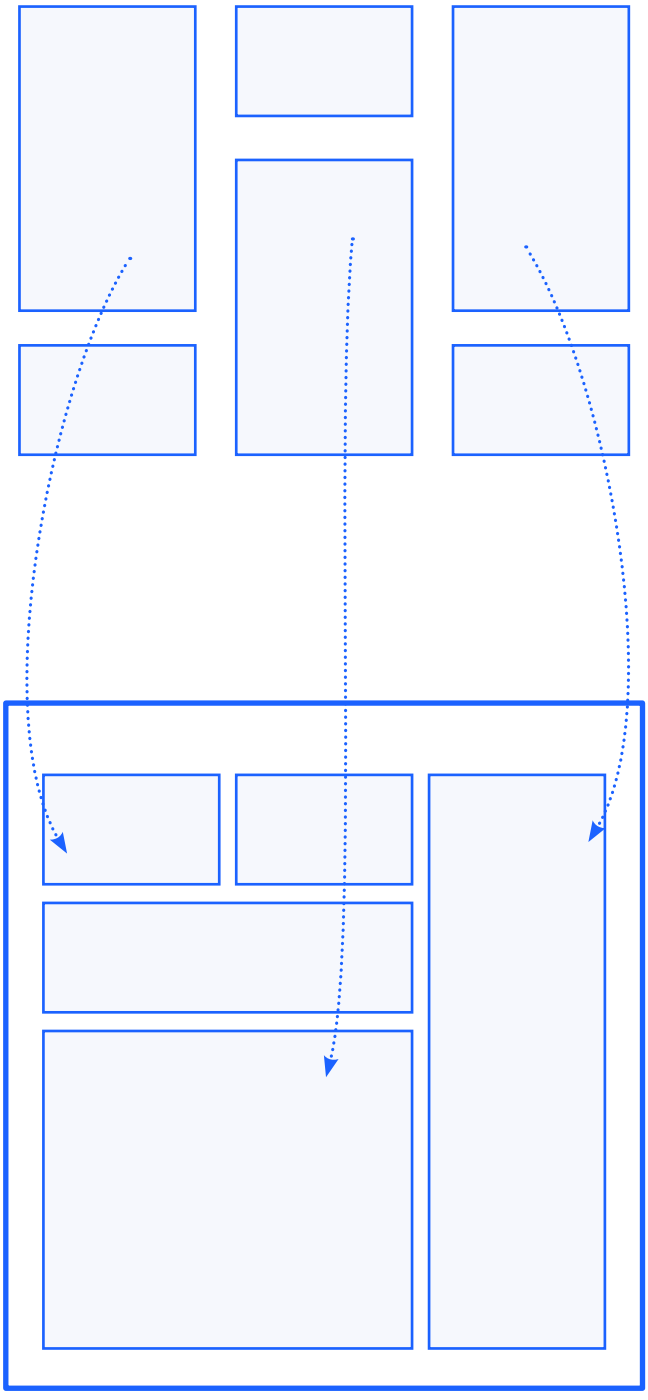
Authorized users are free to modify screens, i.e., the pages. A page can contain multiple components that are made up of containers. The first step is to define the components, after which any number and type of containers can be added to the components, and then the data fields can be added to the containers.

Simple visual editing with Drag&Drop

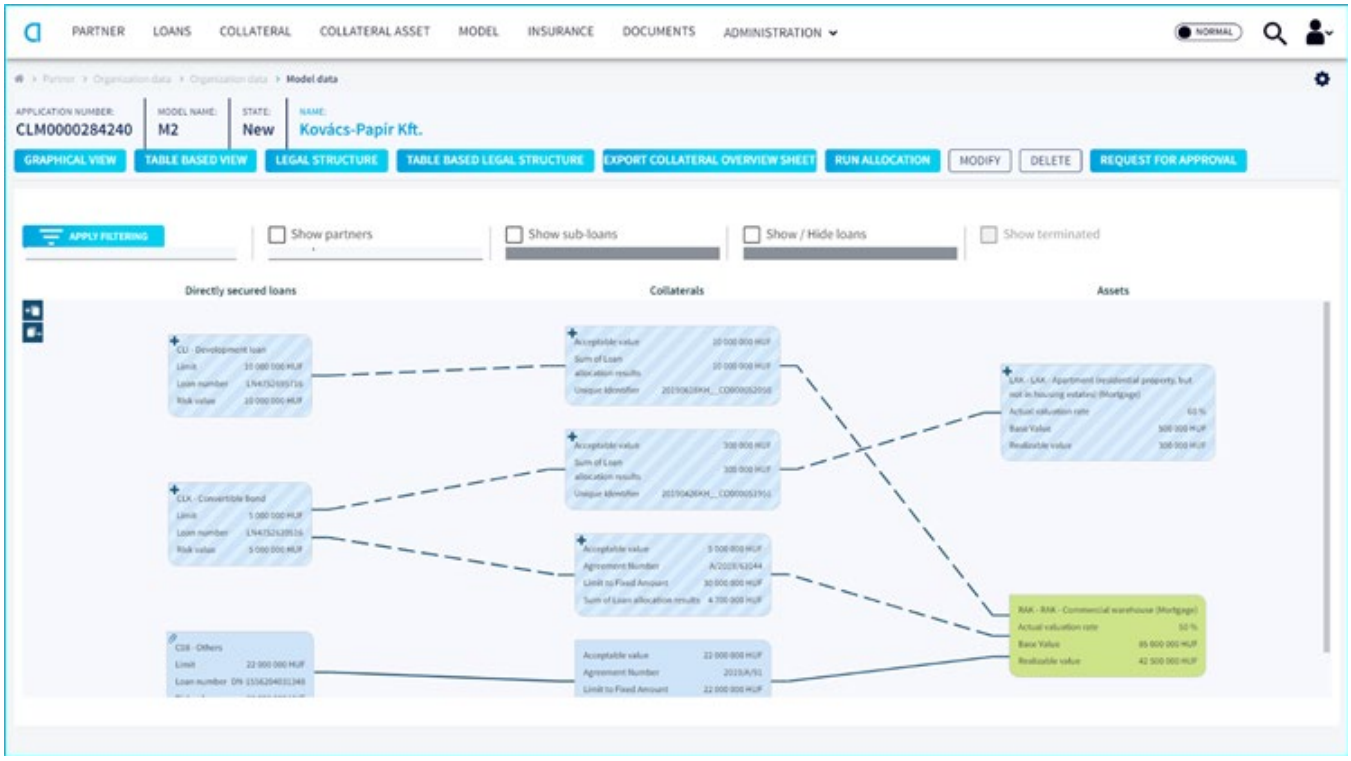


This screen shows the AppDP design mode. On the left side of the screen are the fields of the selected business entity and its associated entities. Fields can be moved to the field containers using the Drag & Drop method, from which components are built. The dragged items can be deleted or modified at any time. Once saved, the changes will be activated at once and no additional settings are required. The order of columns on list pages can be changed using the Drag & Drop technique. To change the order of the columns, simply click on the column header and drag the variable to the appropriate position!

Building a custom screen meeting specific partner needs from various default components



AppPello AppDP custom screen – Collateral net



Complex screens

In the system, the structure of the screens is determined by the page layout. The editor provided by ApPello can also be used to create custom layouts that determine how many screen components (forms, lists, graphs, etc.) are displayed in what kind of layout and size. This allows users to work with a variety of screens where they can be configured with no programming to display a simple form with the highlighted data of an element on a list of items as well as graphs can be depicted on the same page (see figure below). The components can refer to or update each other. So, considerably less screen switching is required, which can improve the user experience.

Custom screens

During the development of our system, ApPello paid great attention to the use of custom components, which allows us to create any graphical view. The following screen shows a unique management view of a collateral net (transaction, contract, collateral):

2.6 RULE **ENGINE**

The Rule Engine is responsible for defining and executing business rules. Its purpose is to separate frequently changing business logic from the source code, in a format that is comprehendible and editable for key users of the Financial Enterprise. It uses standard descriptive language (MVEL) and an integrated graphical editor (decision board) for simple definition and maintenance of rules. Many systems rely on the Rule Engine. The rules hierarchically refer to each other, enabling the scripting of complex algorithms, so users can easily find the calculation formula they want to edit in a complex calculation.

The Rule Engine centrally manages, stores and displays and makes rules editable. The main types of rules are:

- Calculation rules, eg. which determine the value of a field based on a formula, values from other fields or from an external data source;
- Intelligent, customizable field types.
- Decision rules, eg. which determine, depending on the circumstances, the direction in which a business process should proceed;
- Validation rules that decide the validity of data;
- Automatic validations, flexible error handling.
- Display rules that decide which screen or data is to be display based on an examination of certain conditions.

2.7 STATE MACHINE **& WORKFLOW ENGINE**

State machines representing the life cycles of business data (Credit, Collateral, etc.) are the driving forces of the system. The lifecycle of a certain business data determines the associated events, the milestones of its whole life, the operations that can be performed at each milestone for its entire life, i.e., it is responsible for managing the data stored in the system. Pages, rules, operations that are parameterized for each state of state machines and for transitions between states, determine the system screens and available functionality.

Building blocks and the role of the State Machine:

Different data display screens can be assigned to the data states. (Example: For a loan under administration, ApPello may display different data than that for a loan disbursed)

The screens to be displayed can also be controlled by business rules. (Example: Depending on the type of loan, different details may have to be displayed)

The operations and events that pass between states determine what kind of functionality will become available in each state of the data and what kind of system event can possibly occur. (Example: While checking the details of the loan, it is possible to request or decline an error fix.)

For operations, screens can be defined which will define the data entry interfaces.

Operations are subject to business rules that are responsible for the business precondition, calculations, and validations of the operation.

The operations may involve the creation of one or more forms, which, depending on the condition, are generated or printed according to the user's decision.

Operations that do not involve a state change can be defined, with which, data changes or operations that do not involve data changes can be defined. (For example: Attachment of new document, printing of current data, etc.).

Depending on the condition, automatically running operations can be defined. (Example: If a loan is approved, the monthly repayment details are automatically calculated).

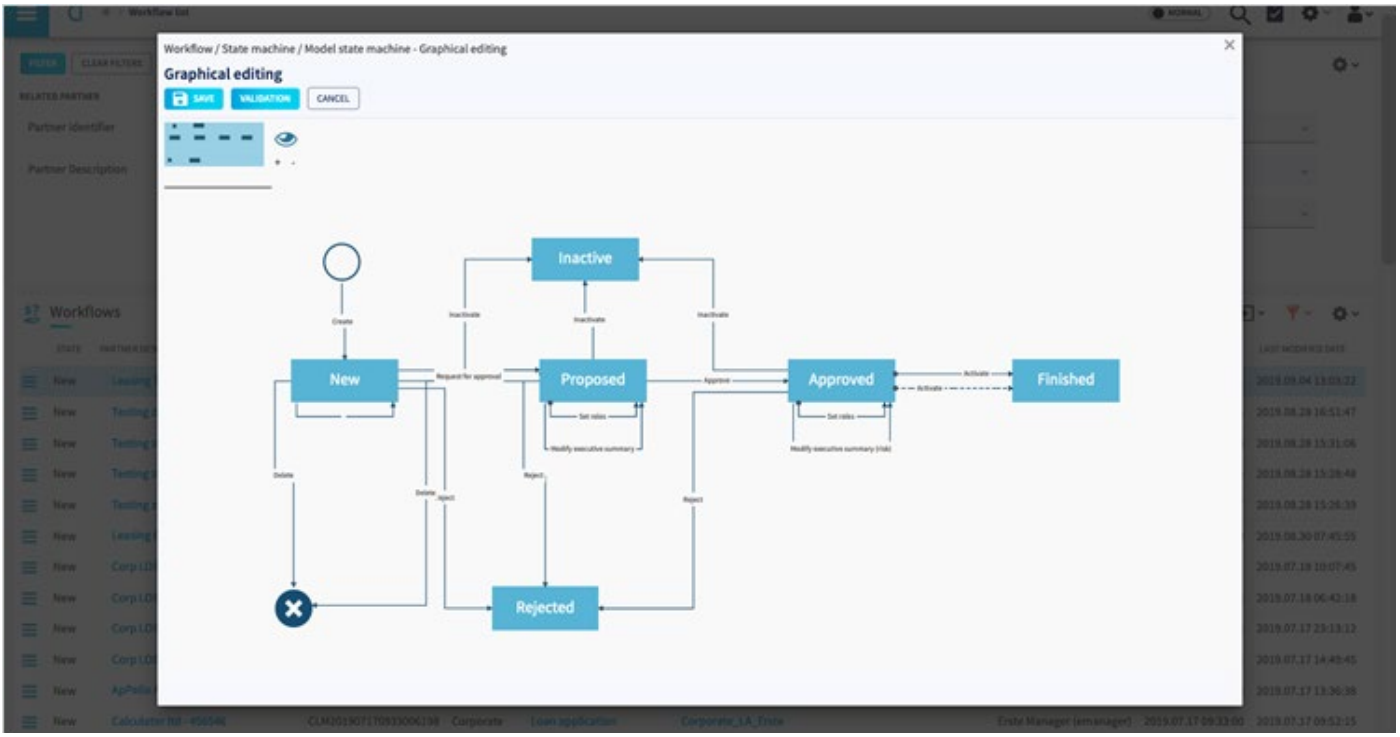
Complex states can be defined, such as state machines, which can be used to split the life of a data set into larger units.

Decision points where the lifecycle of data branches off, is based on the automatic evaluation of a rule. (For example: Credit check: OK, Credit check: not OK.)

Triggers that induct a change in related data as a result of an operation on data.

In addition to providing basic functionality, the state machine also helps to create the most ergonomic interface possible, with additional parameterizable elements. (e.g. operation key highlighting, order of appearance, data path can be viewed by user, etc.)

AppDP state machine-entity lifecycle



2.8 WORKFLOWS **IN THE SYSTEM**

Based on the nature of the workflow ApPello applies different workflow egnine solution within the system.

- External Workflow engines – Activity based / IBM BPM based

External workflow handling can be based on activity or in IBM BPM. If multiple systems are connected and multiple integrations are required, ApPello integrates with an external BPMN engine. This needs a double definition of elements, once in ApPDP and once in the workflow engine. ApPDP can also adapt to changes.

- Internal workflow engines – Human task

This workflow type is the most convenient choice if the flow has subsequent steps and clear decision points. In this case there is no graphical tool for defining and displaying. The tool is for the human task is the state machine.

Within an application only one can be used in the same time. User experience remains the same; the only difference is the way and complexity of parametrisation.

2.8.1 External workflow - BPMN engine

The ApPello App Development Platform is natively integrated with an external Workflow engine (currently based on BPMN 2.0) (IBM BPM and Activiti free engine), which performs both Process Management and Task Management roles.

The workflow engine is responsible for the business processes affected by the system, that is, the execution of tasks, timely execution of system events and the sharing of tasks between system roles, related to each data set.

There are several processes associated with the life cycle of an entity that can mean:

- Stringing operations that are in process available in a data state without changing state. (Example: problems arose while creating an expertise opinion, that need to be solved within a deadline, in a multi-step and multi-role process and all results are logged back into the system.)

- Data is a multi-state process. (Example: During the lifecycle of a loan, an entity takes up multiple states and inter-state activities are stringed)

Interfaces and functions:

- AppDP connects to the process management system through the following standard BPMN 2.0 elements:

- Process Starting Point, User Task, System Task, Message Event.

- An operation or event can be executed from AppDP to trigger a business process. (Example: Due to a problem during a loan restructuring, an approval process can be initiated).

- AppDP can trigger multiple business processes as a result of a checking event. (For example: Starting an annual review process).

- The user tasks to be performed in AppDP are displayed in the logged in AppDP user task basket, which the user can take up and the task will automatically be regarded as complete after successful completion thereof via the appropriate AppDP operations. (Example: Pressing the Loan Approval button completes the four-eye principle approval task)

- Access to AppDP operations is task-controlled, that is, the functions required to perform tasks are only available to the user performing that particular task.

- A task can be executed in one or more steps even in multiple states spanning over data sets.

- AppDP can affect the running of an occurred event in AppDP through message-type events.

Parameter transfer between AppDP and

process management system can occur, which provides the ability to control processes based on business data stored in AppDP and can impact the life cycle of business entities based on process management data.

- Depending on the condition, business processes, closing of tasks and message events can be initiated by using rules.

Possibilities and benefits of integration:

- Flexible modifications and supplementary processes.
- Easy to create business rule-based automations.
- Unlimited workflow alternative for different circumstances (e.g.: various products).
- Automatic task assignment for process participants.
- Scheduling tasks (managing deadlines).
- Tracking of ongoing issues and tasks.
- Four-eye principle and general validations, approvals.
- Quick integration of AppDP for cross-system processes.

2.8.2 Internal workflow engine – Human task

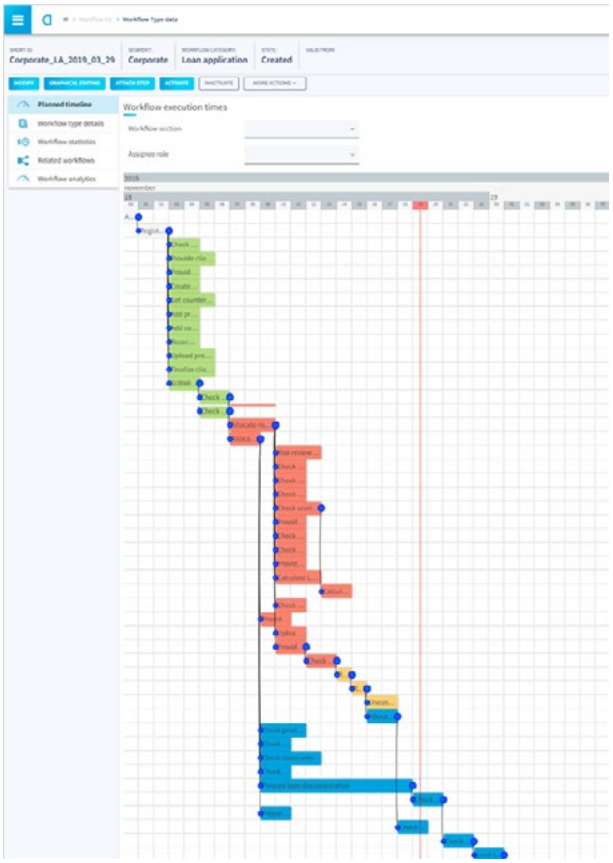
In case of internal workflow the the task is defined in the state machine setting. The tasks of each state and the rules of task creation can be defined in the state machine of the specific entity. The configured tasks will be created if the entity item steps into the specific state. A task can be closed by a transition defined to the specific state so the user in the system does not simply close a task, instead if a specific operation is done, the connected task will be closed.

2.8.3 Edit workflow in ApPDP

The System offers a Gantt-chart based graphical editor engine for the following options:

- Define or modify a workflow from any number of selected workflow steps
- Visualize the standard execution time for these steps
- Define the preconditions for these steps
- The System also automatically calculates workflow statistics on the following levels:
- Comparison of the steps in a specific workflow with the standard time
- Compare workflow steps with other calculated statistics in the same workflow type

Graphical workflow editor – Gantt-chart editor



2.9 **NOTIFICATIONS**

Within the system the Power users can define new notifications or modify any existing ones.

2.9.1 Email Sending Notification (EMAIL)

EMAIL type notification sends an email apart from creating a notification record. Email sending authorisation, on AppDP level, is needed for successful functioning.

In order to send an email, a local module email template ID must be given in the notification additionalParameters field. The format of ID: module_reference name/email_reference name.

2.9.2 Email Templates

The email templates used in ‚notifications „ can be found in the given business module, under Email templates System elements.

2.9.3 Streamline Type Notifications (STREAMLINE)

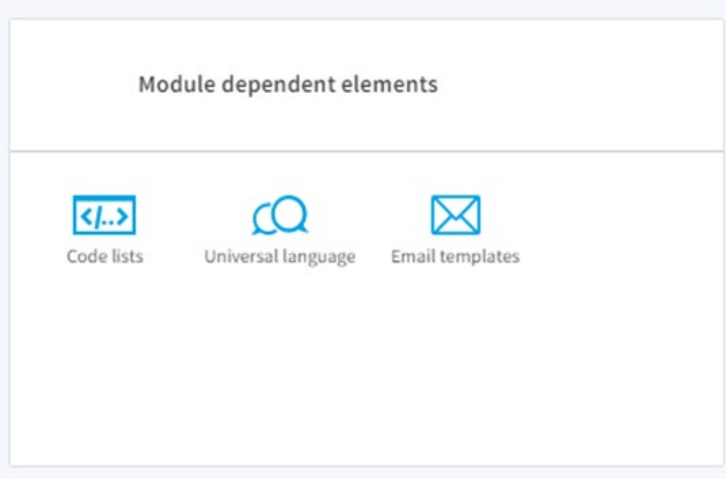
With the help of STREAMLINE notifications, it is possible to send notification messages within the System.

Streamline notifications appear through the notification dashboard element.

Notifications are always related to a given business instance, furthermore, only those users can view notifications who subscribed to receive notifications of given business entity's notification board.

The System only handles notification board messages if ‚showSubscriptionButtons' system parameter is true.

Notification types ??? ?x



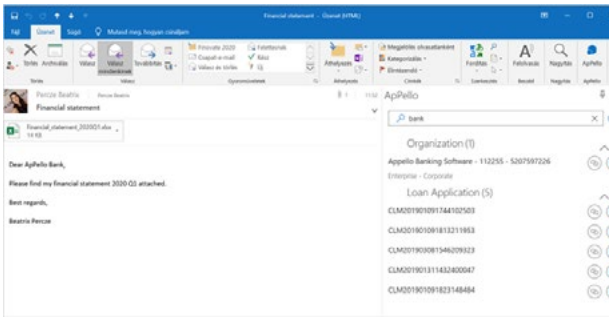
2.10 PLUGINS & **INTEGRATIONS**

Additional ApPello plugins make it easier to integrate information and processes. AppDp also enables to use the following user-friendly features in the applications.

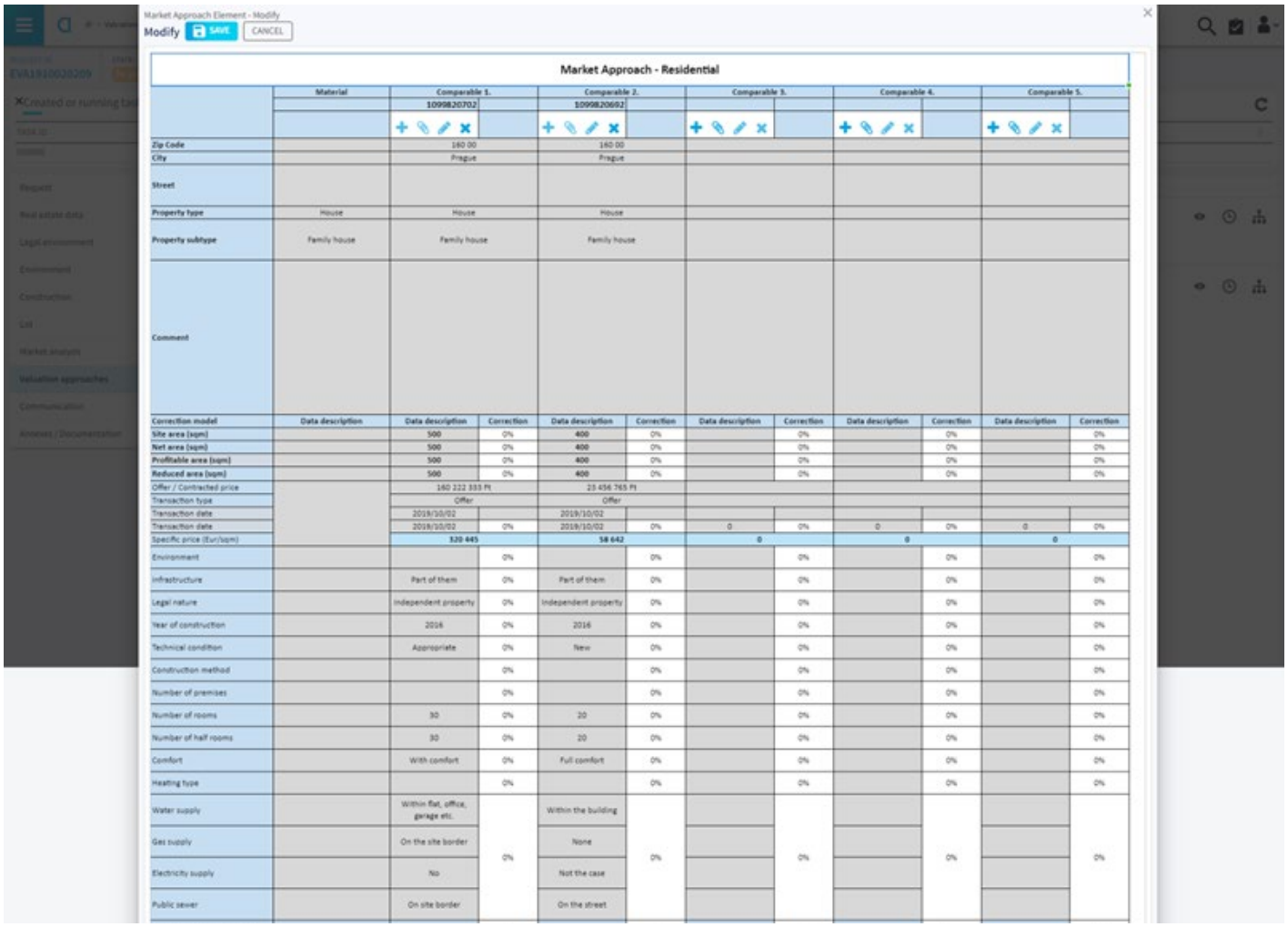
2.10.1 Outlook plugin

By Outlook plugin emails and their attachments can be saved to the Clients. Attachment can be added by clicking on the chain icon on the right. The user can search directly from the mail system in the database for the user name or email address.

ApPello Digital Platform (AppDP) icon in Outlook



Excel plug-in manages Excel template of the end-user



2.11 REPORTS & **PRINTOUTS**

2.11.1 Jasper Reports

For every system, it will be necessary sooner or later to print reports and lists from the stored data. An AppDP report can be prepared for business management purposes (e.g. contracting) but it is able to print tables, reports and massive data used for any decision-making process. In the AppDP administration view, report templates can be defined freely, from which, Users can print reports if necessary and if they are authorized to do so.

To prepare an AppDP report, a template containing required data is needed (e.g. header) and logo, if it is needed it can use dynamically changing data from the database as well. The data source and the printing of the reports will be provided by AppDP, the document frame will be provided by the templates made by Jasper iReport, which is a third-party free template editor.

2.11.2 Word template

Document template can be created in Microsoft Word (docx), the dynamic parts can be referenced with Apache Velocity syntax, the document is generated with Apache POI. The main advantage of this option, that there is no need for a different external template management application, the template is created in Word. The full functionality of Word can be used.

2.11 OMNICHANNEL **SUPPORT**

The Platform supports multi-channel processes and enables clients to have a seamless digital journey throughout branch network, call center, direct channels (digital), real estate appraisals, or via agents.

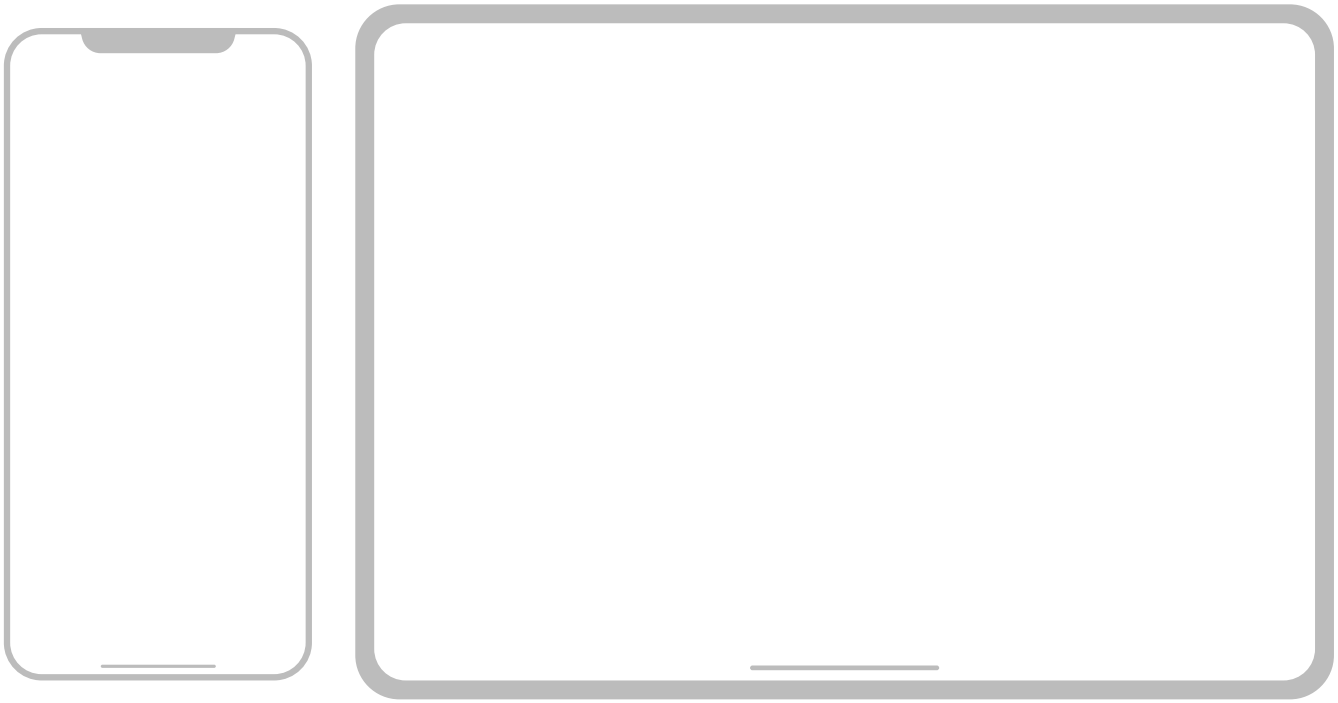
Besides desktop support AppDP is available on mobile devices with Android and iOS operation systems in a native and browser based (responsive) way too.

Main specialities:

- Mobile phones and tablets are both supported
- It is possible to make photos inside the application and add GPS location to them
- Google maps integration

Most additional functions are also available on mobile:

- Dashboard
- Workbasket
- Diagrams
- Streamline
- Offline mode support
- Data can be stored on the device and later be synchronized with the database



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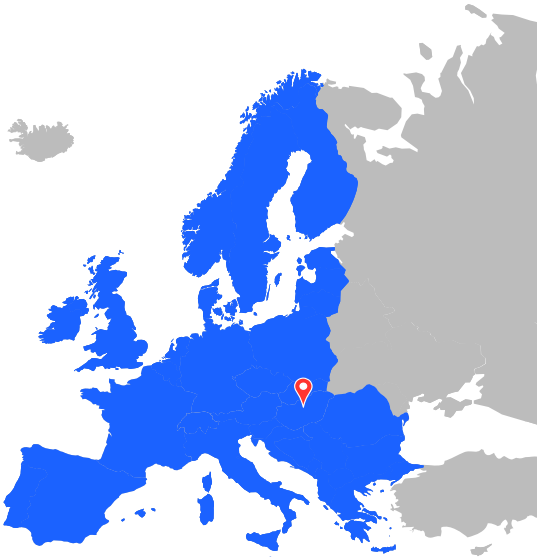

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