МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
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на тему :

Developing Business Transformation Framework for Mixed Product and Service Company

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INTRODUCTION

The idea of perfectly tuned company, where everyone knows what to do, every customer is sure, that his expectation will be met, and owners will be sure in sustainable growth leaded author to start this work. As the Chief Technology Officer and co-owner of the company, I was always wondering – how to do everything better, how to organize processes and deal with challenges, arising on the way of the company lifecycle. Started as a small department in IT Offshore development company, the project became product, and the product became the company. Quantity of customers grew, quantity of employees also increased, the complexity of the tasks and processed started to be overwhelming.

Existing knowledge of process and project management where insufficient, so I decided to learn. First things first, Project Management looked like correct application of efforts. So, I spent half a year learning project management practice and achieved PMI PMP certification. Achieved knowledge improvement the ways of project management but was not enough for effective company management. The question – how to set up processes, how to build effective organization structure, what to do, when the complexity grows, and no one has exact recipe how to achieve company goal leaded me to get further new knowledge.

MSTM Program from UCU was exactly the source of useful information and brilliant ideas that was needed. Each course in the program leaded to the further improvements in my project and company management practices. The idea of processes automation, roles distinguishing, analysis, measurement and optimization became obsessive. The ideal company became reachable – need just to understand all weak points and fix them.

But the company is a living system, which constantly changes to the needs of the customers. New people, new projects, new tasks and working approaches became obsolete, useful tools getting old and non-operative anymore. Proper process implementation will require proper tool set. The company uses different tools for different process automation, and those tools are not connected one to another.

Management team was struggling to put together all the processes, so there became the goal – to use existing tools with greatest efficiency and to create one more tool, that will fill in the gaps of the existing approaches. This tool is the CRM – Customer Relation Management system, allowing to combine the information from different sources, and being itself the source of the information for other company infrastructure components. Customers are the core of business, so the solution decided to be built around the customers

The purpose of this work is to identify and implement business transformation routines to improve overall business efficiency, predictability, and customer perception of the company, that provides both product development and customer support after implementation. The goal is to optimize existing processes, unify them, and to develop the tool for the company to increase overall efficiency of interaction with the customers.

Every step of the business process has to be analyzed, approaches have to be unified, redundant manual work have to be automated and eliminated. The company have to receive instrument for product management, services management, customer management, contracting, billing and getting all the components working together as a ensemble.

In this work the problems and possible solutions are described, developed, and applied in order to improve overall processes management and lead to further sustainable company growth.

CRM System is developed to implement the solutions and approaches. Process changes are already applied by company management team on practice. Transformation continues with additional modules added to the software.

CHAPTER I: COMPANY BEFORE TRANSFORMATION

1.1. Background

Mixed product and service company is the phenomenon, created historically. First, there was service company, proving software development services. The company gathered experience and created special department, to develop its own product. The product became successful and was transformed to separate business unit and afterwards, to the separate company. Therefore, product company was created based on service company.

The product was successful on the marked and was installed in multiple institutions. After the installation, the need of deployment and support services appeared. Deployment and support services transformed the newly created product company back to the company providing services on subscription or hourly rate basis.

Product and Service parts of the company are of the mutual importance and lead to the mixed business model – the company provides both Licensing and subscription business models. This approach leads to the management conflict, as these business models must be managed differently and have different types of business decision making.

Prior to the transformation was the company, which grew fast, but had no actual structure suited to growth. The company management interacted with each customer in person, no matter of the customer size. The tasks where organized in Jira system without distinction between the types of the tasks. Support, development, business analysis where mixed in one huge backlog without clear responsibilities and SLAs.

1.2. Structure

The company is divided to departments, each responsible for its own functions

1. Development team – responsible for the product development
2. Deployment team – responsible for product installation on the customer side
3. Administrative team – lawyers, bookkeepers, administrators
4. Management team – CEO of the company and heads of the departments

1. CEO – responsible for the company overall strategy and decision making

2. CTO – responsible for the technology aspects – what and how to develop
3. Head of deployment – responsible for customer services
4. Head of communications and administrative services – responsible for communication with customers, legal agreements, and process automation.

Company structure is presented in the Figure 1.

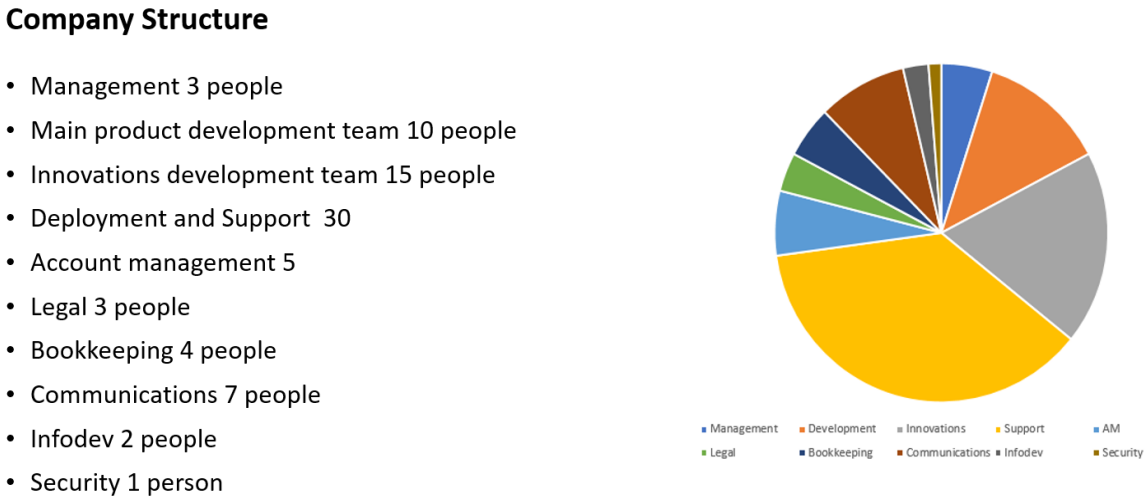

Figure 1. Company Structure

1.3. Customer Base

The company is providing B2B services, automating processes for healthcare institutions.

The company automates business processes for clinics of any size and form of ownership – both governmental and private. On the regional level there is a network of partners responsible for products installation and customer support onsite.

Geographically company operates on Ukrainian market, having several partners abroad, which do the installations a define business model for their respective markets.

No actual customer segmentation was applied – every customer was treated with the same approach and the same workflow.

1.4. Products and Licensing

Before transformation company provided one general product for healthcare institutions management. Every other option provided to the customer was the service, billed on time and material matter. The license was permanent and was purchased by

the quantity of workplaces. The same workplace could be used by multiple employees. Workplace refers to the single computer of the employee.

1.5. Service Model

Support and custom development were provided on time and material basis. Hourly rate for support and development services was the same and it was fixed in support agreement. Subscription contained two prices – one for prepaid hours and second for extra hours. The more prepaid hours customer buys, the less is the price of an hour. Required team size could be planned based on quantity of prepaid subscribed hours.

Deployment was performed by the same team, that was doing support, so when new big customers started installation process the quality of support provided to other customers went down – everybody was busy with new customers.

Services was divided by three types:

Deployment and support

Development

Web and Mobile Development

Deployment and support were treated like non-development work, and this activity was performed by specialists of system set up, called Product Implementation Analysts.

Development was general grouping for all tasks related to implementation of new features and creating new modules for main healthcare automation product.

Web and Mobile Development related to all development activities performed "outside" of the main product. Customer web sites implementations, mobile apps, integrations with external systems, all treated as one type of job performed by special "Innovative" team.

1.6. Cost center structure

Every time report was related to separate project. Projects were organized to the tree view structure, with every customer to have its own branch in the tree with

different types of activities as the leaves of these branches. This approach made hard to distinguish between different types of activities. Employees could report their time without filling in the reference to actual Jira task.

It was easy to calculate general statistics over the project (customer) but was impossible to split finances between company departments.

No specific services were distinguished, except of separate agreements for support, development and web and mobile development.

1.7. Task Management Workflow

All of the tasks were stored in single task repository based on Jira product. There was single workflow for all types of tasks.

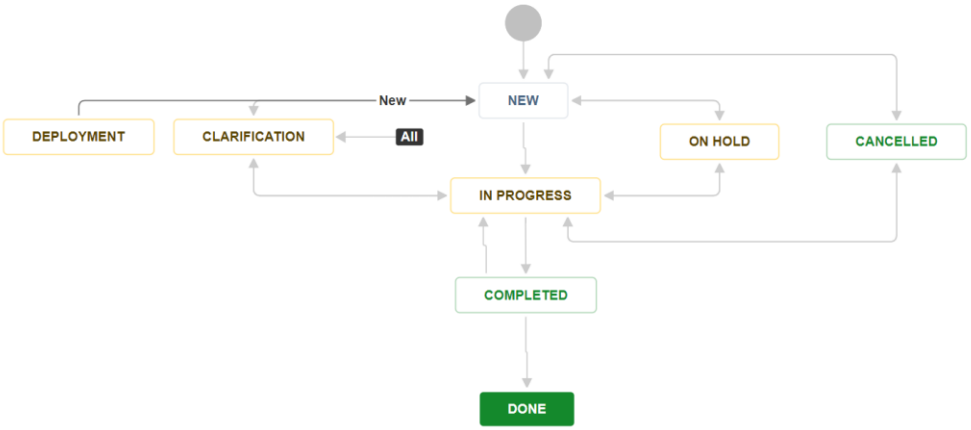

Figure 2.1. Initial Task Workflow

All tasks were created in status NEW, then passed to statuses Clarification (in case, when something was unclear), On Hold (If the task needed to be postponed), Cancelled (If the task was no longer needed). Happy path of the task leaded to status In Progress, then finished by Completed and finalized in status DONE.

This approach was good for simple deployment and development tasks, but it has not reflected all of the complexity of activities, responsible people and possible outcomes.

1.8. Process Automation

Before the transformation there was three systems for business process automation

1C – bookkeeping system, gathering all financial data

Jira – task management software with one standard workflow for any task.

Jobdone – time tracking system.

1C was used mainly by accountants. Financial data was also available for the Company Management, but the usability of this product is poor, so summary information was requested by managers to be generated in excel format for further analysis. No easy way to access financial data available.

Jira is a powerful tool, with ability to define tasks workflows, track the time, calculate statistics and distinguish security access. This system was underutilized at the initial state of the company, and here we have the point of possible improvement.

Jobdone is simple time tracking tool developed by our company with backend based on 1C system. It allows the employees to report their work. Required fields are: date, project, employee and duration.

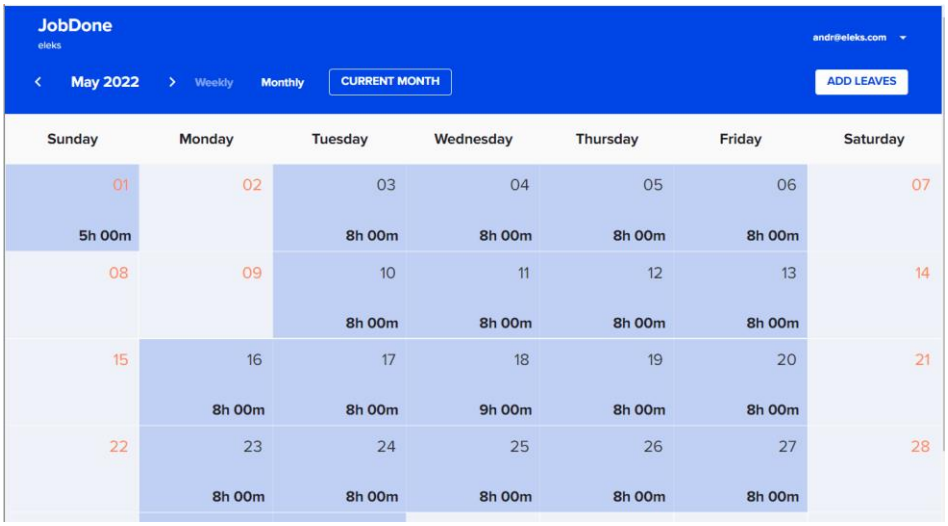

Figure 2.2 Job Done Reporting Tool

Chapter II. BUSINESS TRANSFORMATION

2.1. Introduction

As the company grew and quantity of customers increased, existing structure show its weaknesses. Every component of business organization requires improvement. So, management team organized several strategic meetings and decided to address changes. The process of continuous improvement was declared on company level with subsequent strategy definition and implementation.

Author, as the CTO and one of the owners of the company facilitated the improvement processes and together with management team brought the improvements to life, thus creating the framework for business transformation of our mixed product and service company.

The team implementing changes consisted of CEO, CTO, COO, and team of Department leaders. Processes were analyzed and defined in each team subsequently. The implementation of the strategy leaded to creation of the new system – Customer Relationship Management System, which consolidated the data from all the components into one system automating customer relationship and business processes.

Changes were demanded from employees, customers, and business owners. The main issue was with day-to-day routine – responsibilities of employees, time of the reaction to requests, quality of task completion, and afterwards complains from the customers and problems with approval process.

Common questions about responsibility leaded to formalized workflows for every employee specialization. Problems with reporting leaded to changes of the project tree structure and reporting rules making Jira task obligatory to be filled in during reporting.

2.2. Approach

Kotter's 8 Steps for Change Management [1] were used to facilitate changes.

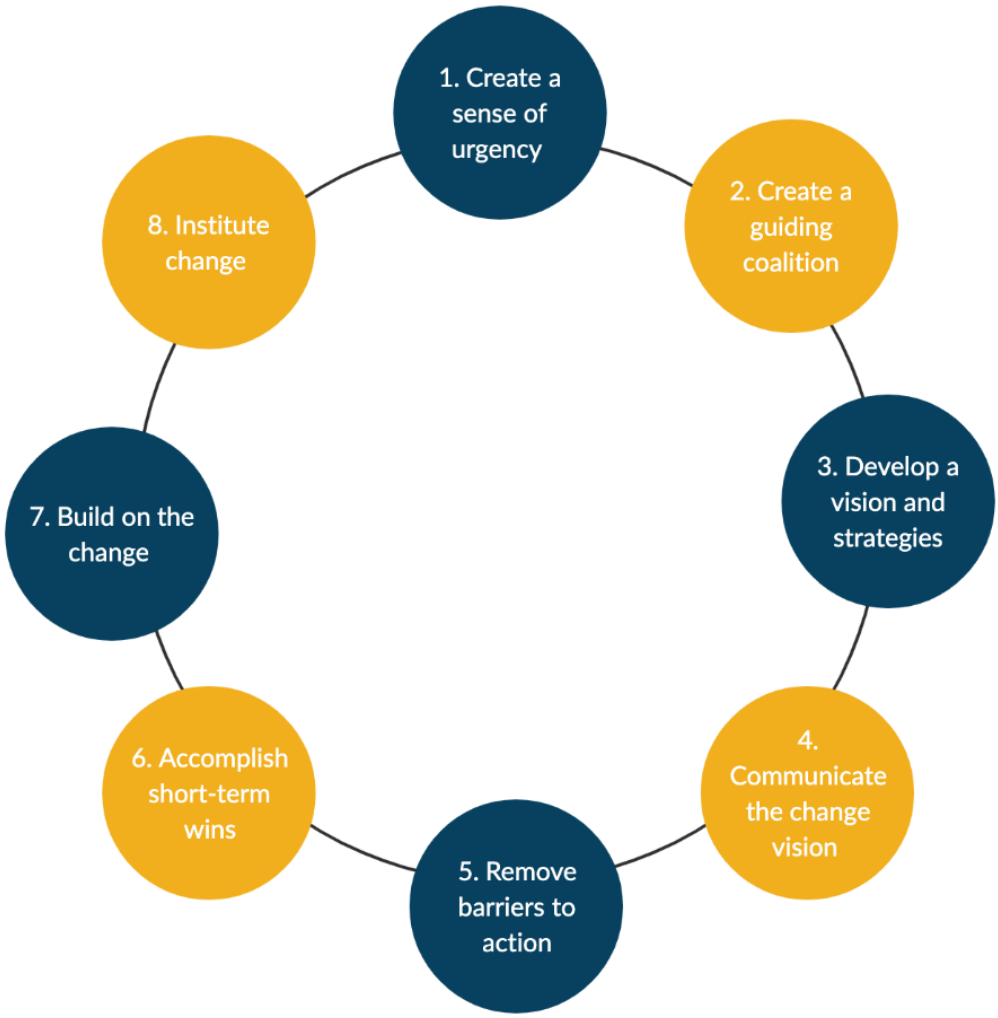

Figure 3. Kotter's 8 Step Change Model

2.2.1. Create sense of urgency

Medical reform in Ukraine was both a challenge and opportunity for the company. Suddenly, the quantity of medical institutions that need automation increased from hundreds to thousands, and existing approach simply could not cover the flow of the task. The team size increased from 20 to almost 100 and existing approaches were insufficient. Management Team understand that we need to change and need it now.

2.2.2. Create a guiding coalition

Management team was organized by CEO and series of strategic meetings was held. Team of CEO, CTO and COO was strengthened by Head of Deployment and

team leaders of main operating streams in the company. Employees were enthusiastic to participate in this transformation process.

2.2.3. Develop vision and strategies

Series of strategic sessions leaded to the understanding of key problems and ways of improvement. As a software development company, we focused on the processes automation and possibility to improve existing instruments. SWOT analysis [2] was used to identify Strength, Weaknesses, Opportunities and Threats in existing approach. Changes were proposed in almost every area of the process.

2.2.4. Communicate the change vision

Proposed changes to the process were communicated to employees, management and owners of the company using team email. Special digests sent monthly passed the information to the team. Feedback was gathered using Workday Peakon Employee Voice product [3], which allowed to gather ideas from the team members.

2.2.5. Remove barriers to action

There were several major constraints, making changes hard to implement.

1. Routine. General task flow overwhelmed all of the team members and no time was left for the change's implementation. We addressed this problem with planning of regular meetings and implement our strategy using Agile methodology [4].
2. Dependance on external resources. Our company is a member of holding of companies, so our processes need to align with the processes of the holding. Management software – 1C, JobDone and Jira are operated by administrators of the holding, so any improvement of these tools have to be authorized and implemented by administrators of holding.

   To address this problem, we decided to implement our own software – CRM, which will integrate with existing components and will cover all missing parts.
3. Communication with the customers. Our customers had expectations based on previous communication. The approaches are changed, so customers now

must deal with the new rules. They no longer can call company CEO to address minor problem and have to use the tools we provide. Every request have to be registered in Jira, customer also have to be involved in the process of approval estimates and formal task definition. In order to address this problem, we defined new SLA rules and made our processes as clear and logical as possible. Processes were also discussed with major customer representatives prior to the implementation.

2.2.6. Accomplish short term wins

The changes first started in two modules – reporting (Job Done) and task management (Jira). Both employees and customers felt the improvement of the process manageability and predictability. First results and first feedback received 1 month after changes applied. The process of reports reconciliation with the customer became much easier. Managers, spending 1 week of their time every month to this process now managed to get the approval from the customer in about 8 hours of their work thus leading to productive usage of managerial capabilities.

2.2.7. Build on the change

Business transformation newer stops. Market changes, customers change, new competitors appear, new approaches, new challenges lead to the principle of continuous improvement. Theory of constraints [5] approaches by Eliyahu M. Goldratt was used for implementing changes:

1. Any improvement is a change
2. Any change is a threat to someone's security
3. The result of change is emotional resistance
4. To overcome the emotion, we need stronger emotion
5. Due date performance needs to be measured.

In the process of changes implementation, we need to monitor three basic measures: Throughput, Inventory and Operational expenses. In our case throughput leads to the contracts, products and services provided to the customers, Inventory is people doing the job and operational expenses is for the most part their salary. Every change must be economically effective and have to lead to results in improved KPIs.

2.2.8. Institute Change

Make change stick is the goal of this step. Changes become the new reality and there is no way back. Organizational processes, values, structure have to be implemented as the new culture and it has to align with strategic direction. Constant verification of the results includes identification and reinforcement of processes and people who lead to desired changes.

2.3. Organization structure

Company grew, and new roles and responsibilities appeared. Separate departments for Information Development, Account Management, Legal, Security, Call center, Communications was created. New role of COO was introduced to manage these organizational processes. Support and Deployment were split to separate teams to provide predictable result.

2.4. Customer base

Customer base was analyzed and categorized. Revolutionary was the decision not to install standalone product for institutions with less then 10 workplaces. Such installations were previously big problem for deployment. Special cloud based solution was created for such customers with SAAS service model.

New customer types appeared – insurance companies, pharmacies and lightweight governmental institutions. They all had no need in big solution but were happy to utilize cloud capabilities of the cloud based product installation. New customers leaded to the new billing approach, thus invalidating permanent licensing for the software. The company works only on SAAS principle with the new type of customers.

2.5. Products and licensing

The company agreed to the strategy of movement from permanent licenses to SAAS. To do that, some services, that were provided as development or deployment services became the new SAAS products. For example – mobile application development and laboratory integration.

2.6. Service model

The company continues to provide services. Significant change here was to move some services to become SAAS products and to change billing model from hourly based to annual subscription. Second change here was to categorize service types for the customers. With the new task types and workflows customer received control over his spendings. Every type of service now can be distinguished and have different pricing: management, development, support, security services, information development – all these activities had at first similar price and reporting rules. After changes applied, type of the task in Jira represented expected role of engineer to fulfill the task. These changes are described in detail in Chapter III.

New for our company principle of similar rules to everyone first was generating a lot of complaints from the customers, but afterwards everybody understood the new rules.

2.7. Cost Centre Structure

Initial tree view project structure proved to be inefficient. Main problem was with management of such a structure – when new customer was added, manager had to create subproject for every type of activity for this customer. If some activity was omitted, problem with reporting and timesheet approval was inevitable.

The idea of change was simple and efficient. Instead of having one project tree we can have one project tree for activity types and make customer the second dimension in reporting structure. Afterwards, third and fourth dimensions appeared – the Product and type of payment, but these changes yet have to be implemented.

So now timesheet will have following properties:

1. Activity type (selected from the type of the task in Jira)
2. Customer (separate dictionary, also managed in Jira)
3. Type of payment (Fix Price, Hourly Rate, Non-Billable)
4. Product (to be implemented)

After adding these attributes to the time reporting the company received powerful tool for efficiency analysis.

2.8. Task Management Workflow

Instead of using one single task type and one single workflow for every task, management team defined and implemented task types and workflows for every type of service provided to the customer. Now tasks can be analyzed by type, status, and product they are related to.

Significant change here was to require formal approval from the customer for all custom development efforts. Development hours are expensive, and customer has to know in advance and approve the costs.

2.9. Process automation

In process of implementation of the changes the company came to problem, that no existing software in place can cover the needs of the new requirements. Systems were isolated from one another, were supported by separate teams with bad luck of communication. The decision was to create the new tool and add there all the functionality required for the changes to be applied. This tool is Customer Relationship Management system, described in Chapter IV.

Chapter III. PROCESS AUTOMATION

3.1. Introduction

In order to perform changes on the organization level first step was to identify the key roles and task types people perform. Functional duties have to be enforced by the workflow system and here we used Jira as for process workflows implementation.

Tasks in Jira must be categorized, and proper workflows and responsible personnel must be defined in each step of the business process.

Workflows are created for personnel to understand steps of the process and responsible actors. After analysis was created several groups of task workflows:

1. Product Management – product creation process automation
2. Sales – for sales team activities
3. Deployment and Support – tasks for Deployment team and Support team
4. Development – development processes automation
5. Management – control over other processes, meetings, reporting

6. Account Management – agreement control, entry point to all other tasks and workflows
7. Information development – document writing process
8. Legal – legal department processes automation

3.2. Product Management

3.2.1. New Product

AM-New product – workflow for the new product development and registering in the system.

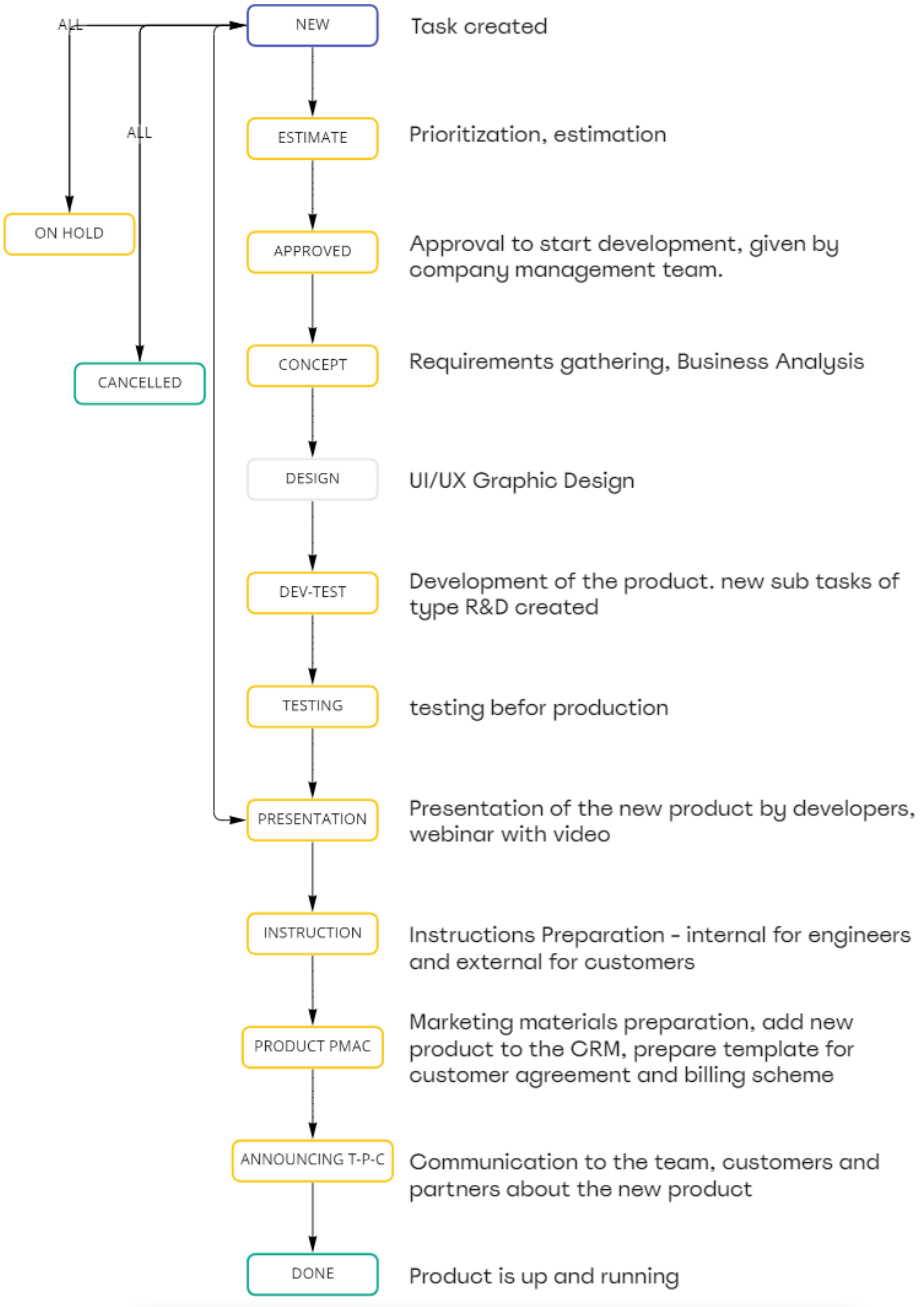

Figure 4. New Product Workflow

3.3. Sales

3.3.1. New Lead

Lead (Sales) – workflow for registry of the new potential customers.

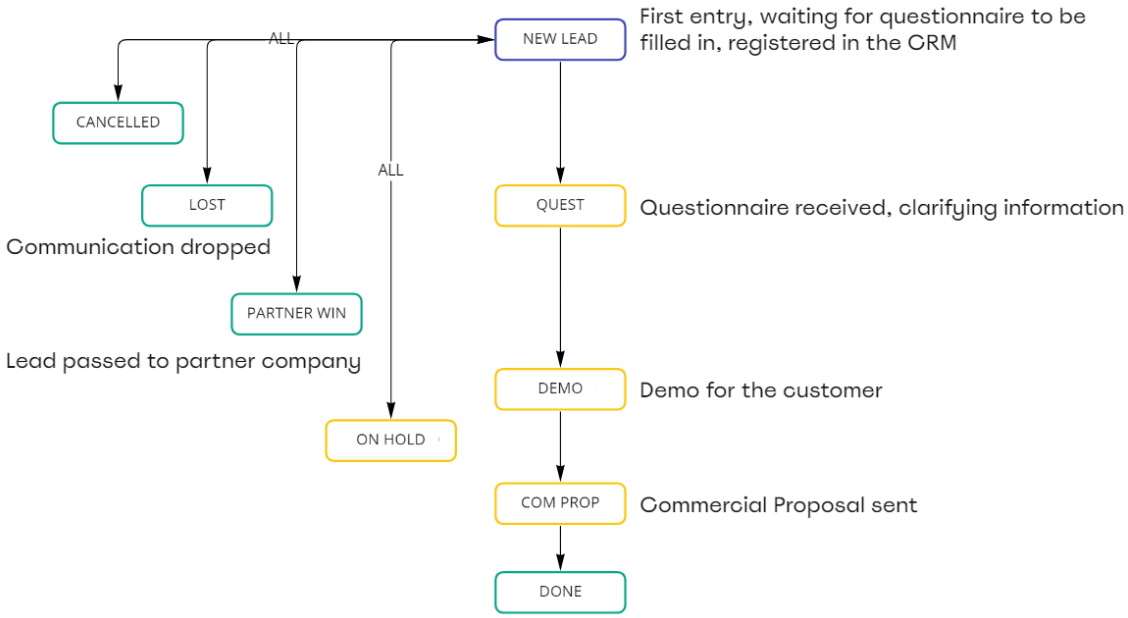

Figure 5. New Lead Workflow

3.4. Deployment and Support

3.4.1. Deployment

Deployment (DE) – deployment task workflow. Deployment is done right after the new licenses purchased and the new customer needs the product to be installed in its infrastructure.

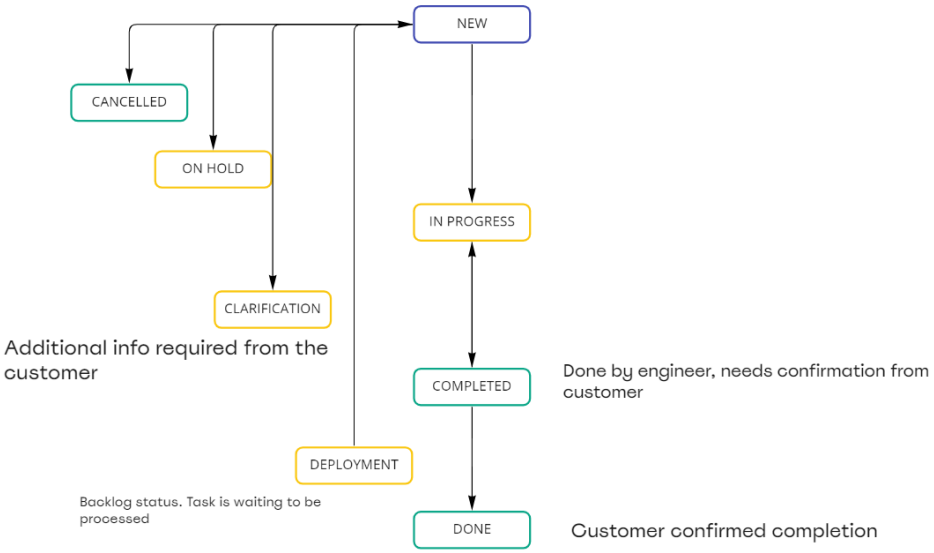

Figure 6. Deployment Workflow

3.4.2. Support

Support (DE) – support task workflow. Support hours are covered by support agreement, so project manager have to check the existence of active support agreement prior to assigning the task to the engineer.

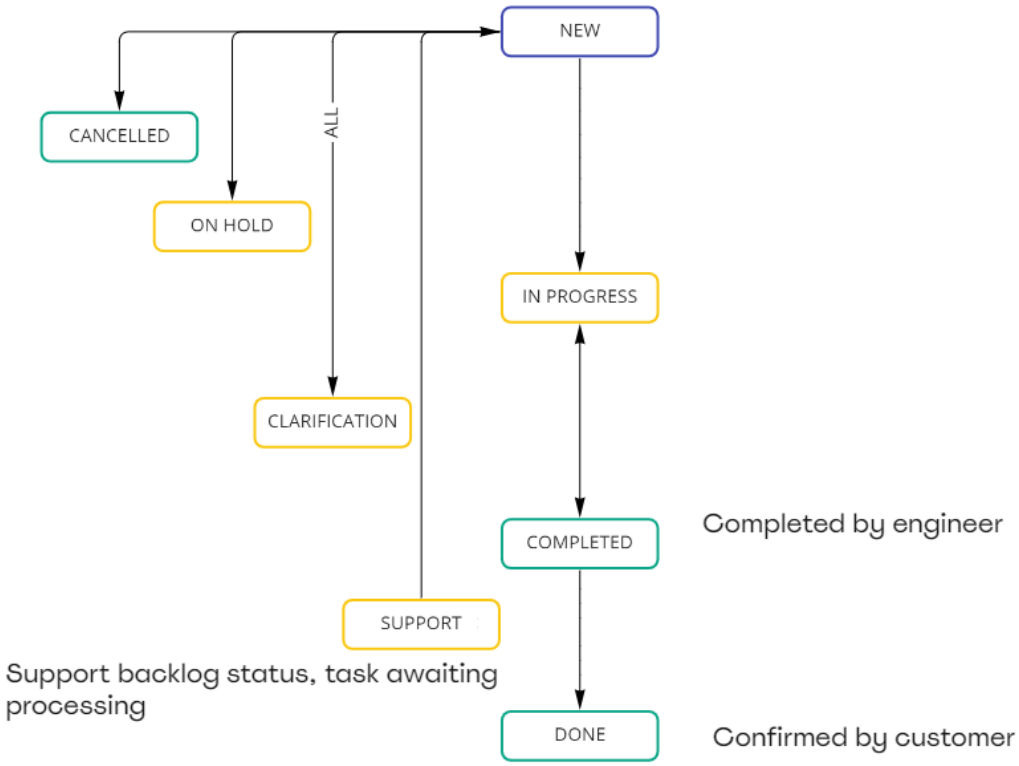

Figure 7. Support Workflow

3.4.3. Non-Billable Support

NB Support (DE) – workflow for bugfix of support tasks. When something done wrong, customer doesn't have to pay twice.

Workflow for Non – Billable Support is similar to Support Workflow, presented on Figure 7.

3.5. Development

3.5.1. Development

Development (DE) – custom development task workflow. Used for tasks ordered by the customer and performed by development team based on time and material agreement.

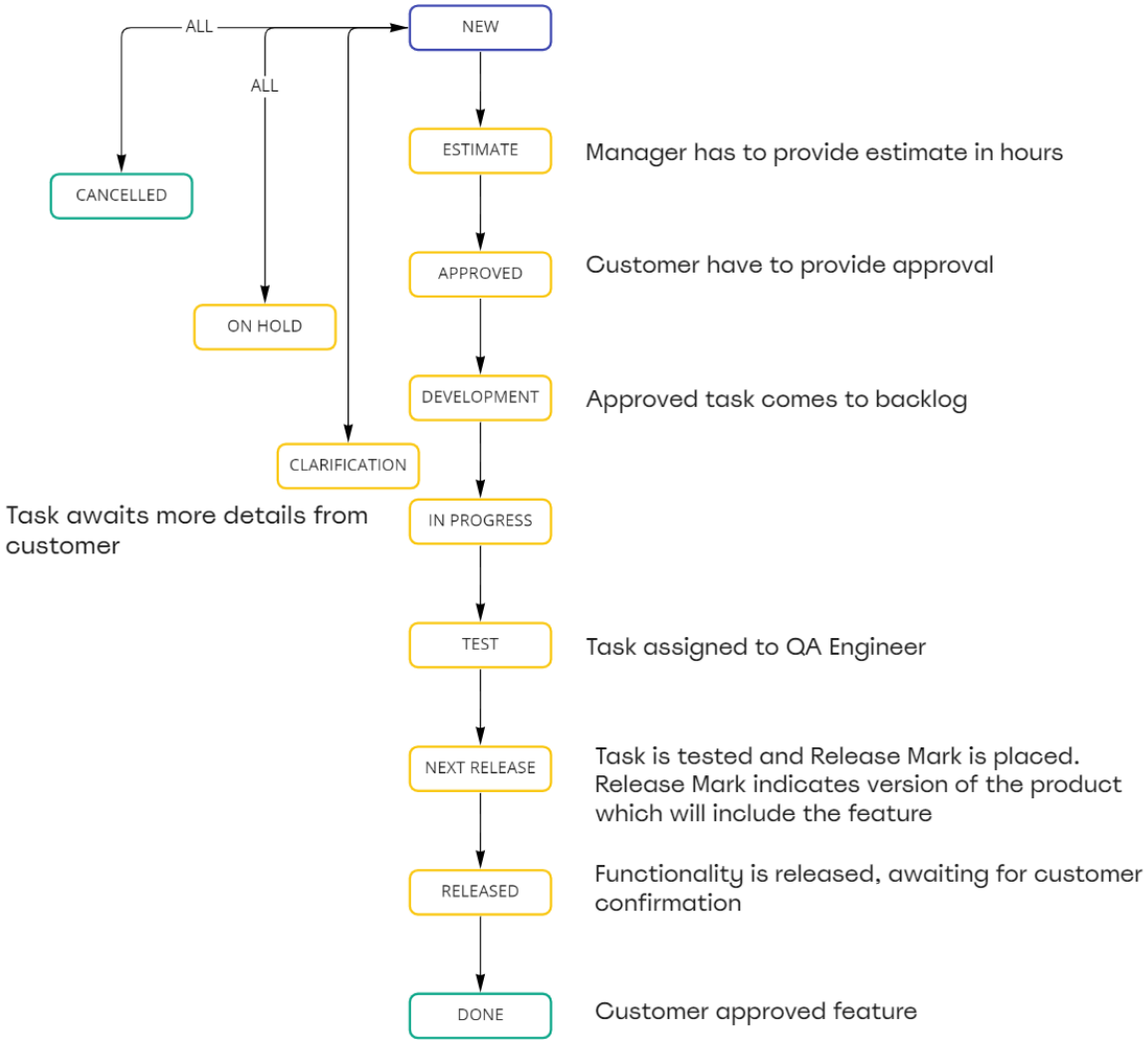

Figure 8. Development Workflow

3.5.2. Non-Billable Development

NB Development (DE) – non billable development is used for two major purposes. First is bugfix, when the team needs to implement changes without payment, and second is fix price development, where the scope is defined by agreement and no actual report is provided to the customer.

Workflow for Non – Billable Development is similar to Development workflow, provided on Figure 8. The only difference is that Approval for the task is provided not by customer, but by the Project Manager.

3.5.3. Web and Mobile Development

WEB and Mobile (DE) – development of mobile applications, APIs and web sites. This task type is different from Development, as it had different release cycle and is developed for each instance of web site, mobile app or API separately.

Workflow for Web and Mobile Development is similar to Development Workflow presented on Figure 8.

3.5.4. Non-Billable Web and Mobile Development

NB Web and Mobile (DE) – bugfix for web and mobile apps. Also used for fixed price projects, when we do not have to provide hourly report to the customer.

Workflow for Non – Billable Development is similar to Development workflow, provided on Figure 8. The only difference is that Approval for the task is provided not by customer, but by the Project Manager.

3.5.5. Research and Development

R&D (DE) – workflow for new development outside of any scope of any existing project. Used for investigations and new products development, until the new product come to production.

Workflow for Research and Development is similar to Development workflow provided on figure 8. The difference is in the Approval process, which have to be provided by company management.

3.6. Management

3.6.1. Management

Management (DE) – management task workflow. Here we have all meetings and management routines, which are commonly not covered by the customer.

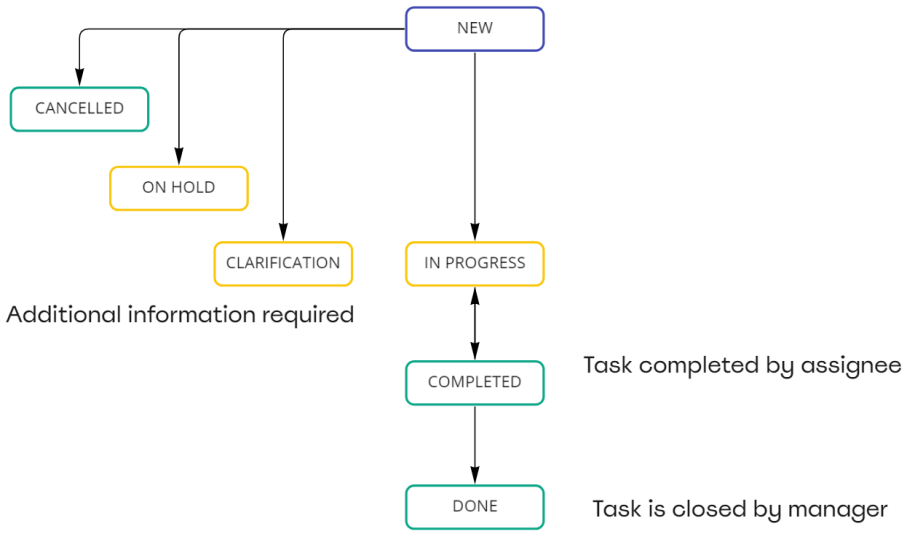

Figure 9. Management Workflow

3.7. Account Management

3.7.1. Request for the new license

AM-Add lic – request for the new license. Task can be created by customer in Jira and then processed by responsible personnel. Must contain the name of the customer and quantity of licenses purchased.

Temporary licenses provided first, and they are replaced with permanent only after payment received.

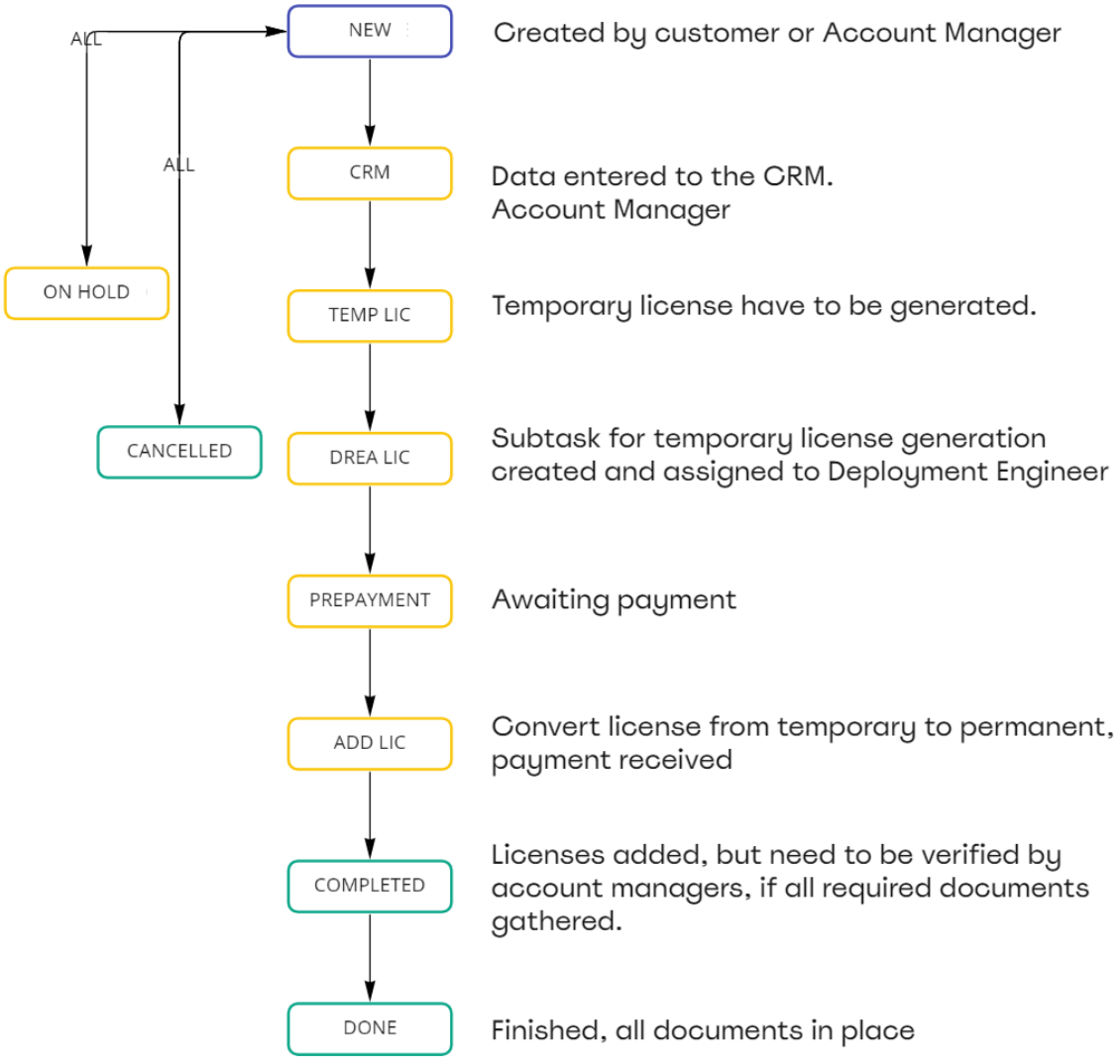

Figure 10. Add License Agreement Workflow

3.7.2. Request for private clinics deployment

AM-Dep Private – request for deployment of product in private clinics.

The task has to include information about institution – location, name, Tax ID, Bank Account, list of work to be done. This task type represents fixed price contract for product installation in private clinic.

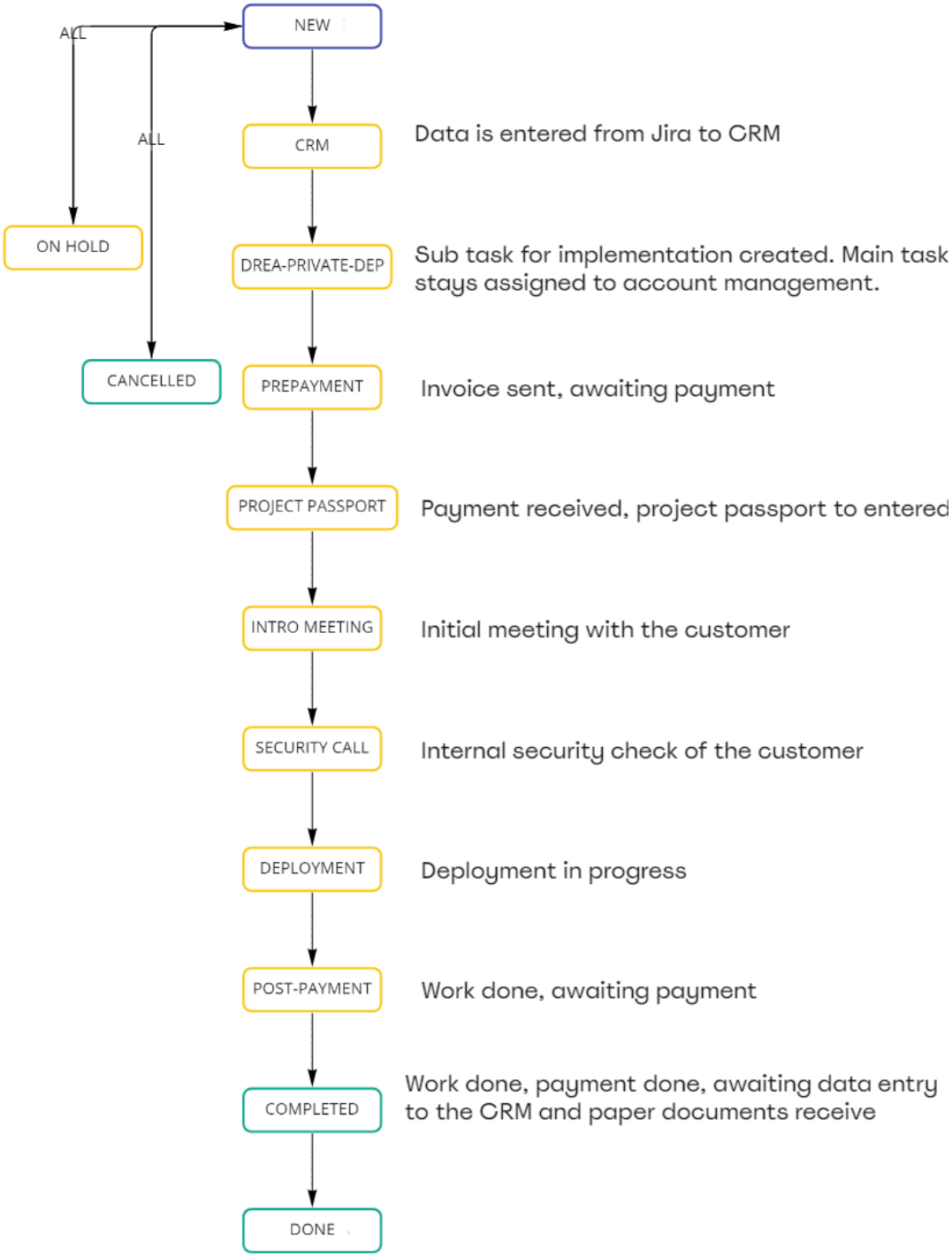

Figure 11. Private Deployment Agreement Workflow

3.7.3. Request for public clinics deployment

AM-Dep Public – request for deployment of product in public clinics

The difference between private and public is in the flexibility of payment. Public clinics have to do formal tender procedures and can have some restrictions on advance payments.

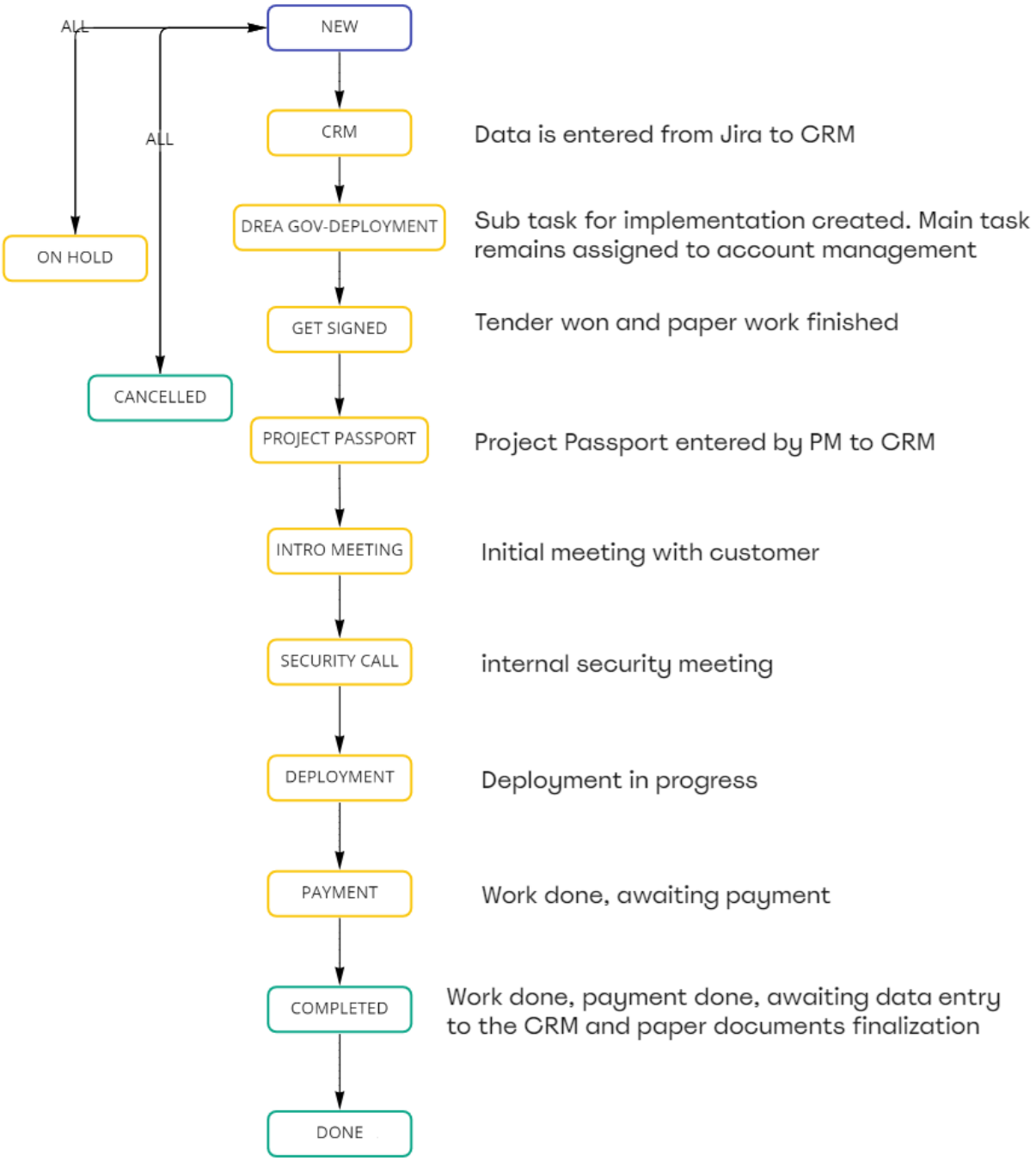

Figure 12. Public Deployment Agreement Workflow

3.7.4. Request for development for private clinics

AM-Dev Private – request for development for private clinics

Custom development for private clinics is done based on fix priced agreements with exact technical specification and the rule to start development only after advance payment received. This approach saved the company a lot of resources – when agreement was signed, but no advance payment done – no actual work was performed and the loss of workforce was minimized.

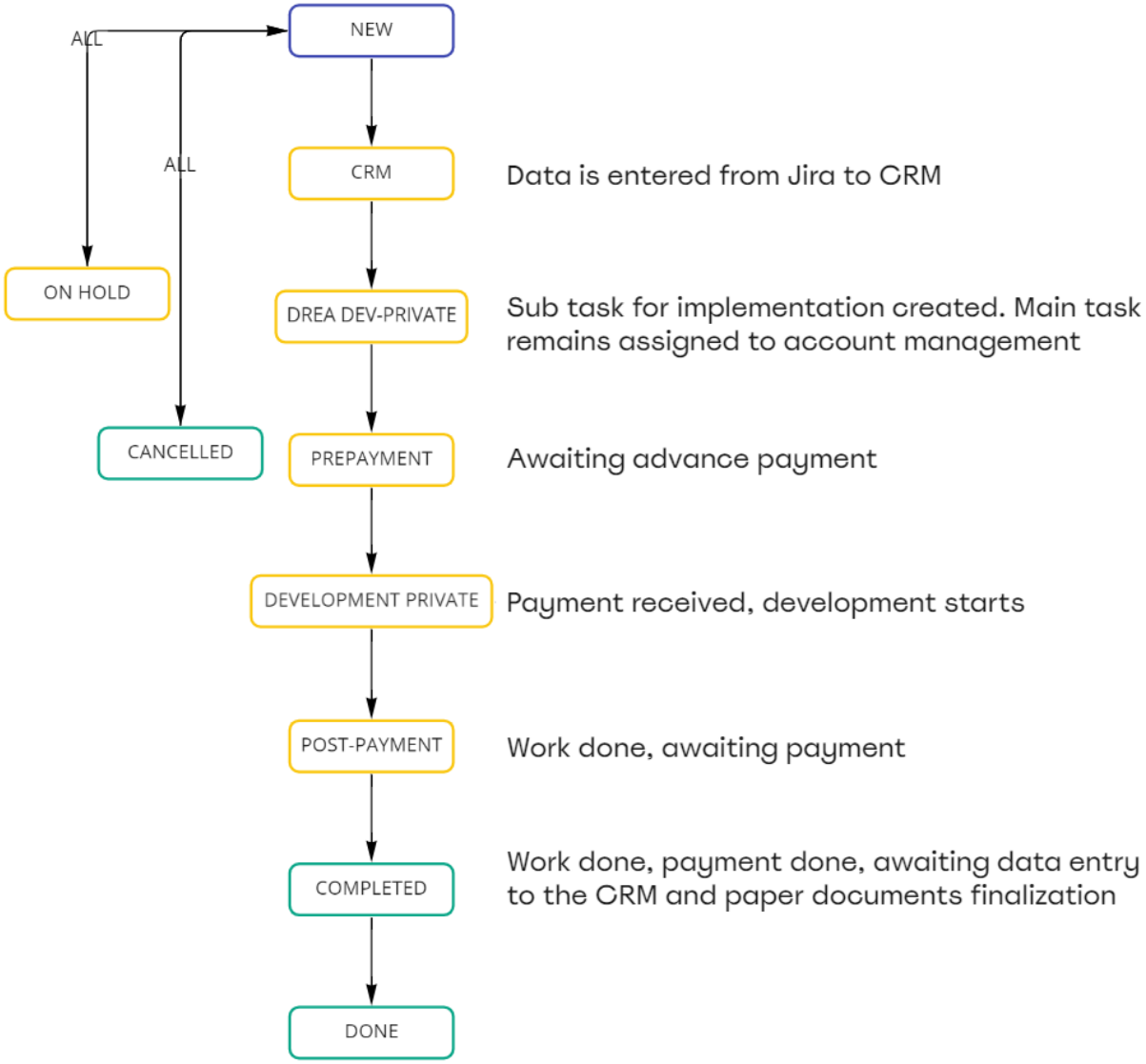

Figure 13. Private Development Agreement Workflow

3.7.5. Request for development for public clinics

AM-Dev Public – request for development for public clinics

Governmental institutions in Ukraine tend to work with fix price agreements signed and approved after Tender procedure. No advance payment available in the most cases. Payment is done only after whole work was done and accepted by customer.

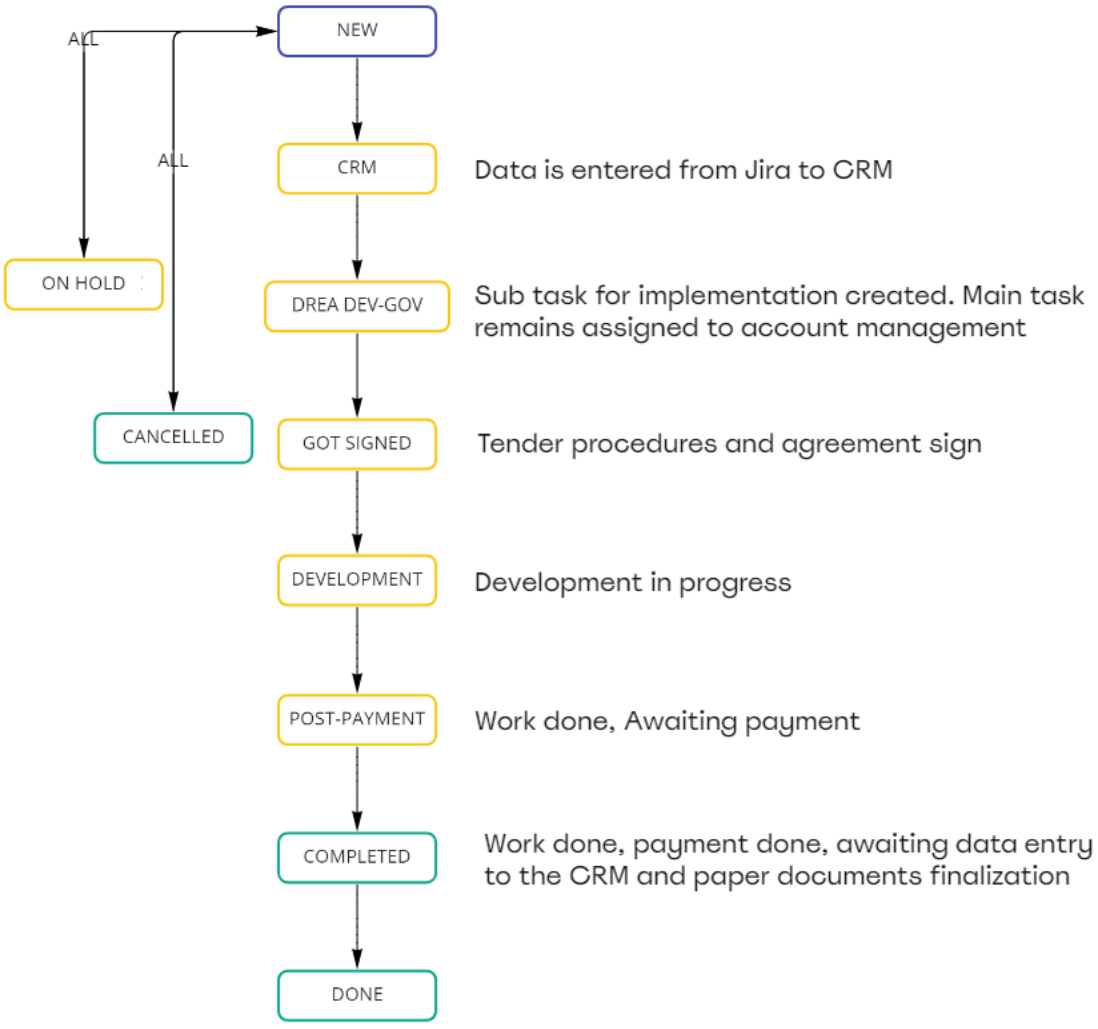

Figure 14. Public Development Agreement Workflow

3.7.6. Request for Integration with Pre Payment

AM-Integr Pre(WH, SMS, ATS, Fiscal) – request to integrate warehouse, sms gate, fiscal device or phone central to the product.

Workflow is very similar to custom development workflow for private institutions, but with custom development we take advance payment and then

post payment after work done. In this case we take all money in advance, as this is the license fee, not the payment for work being done.

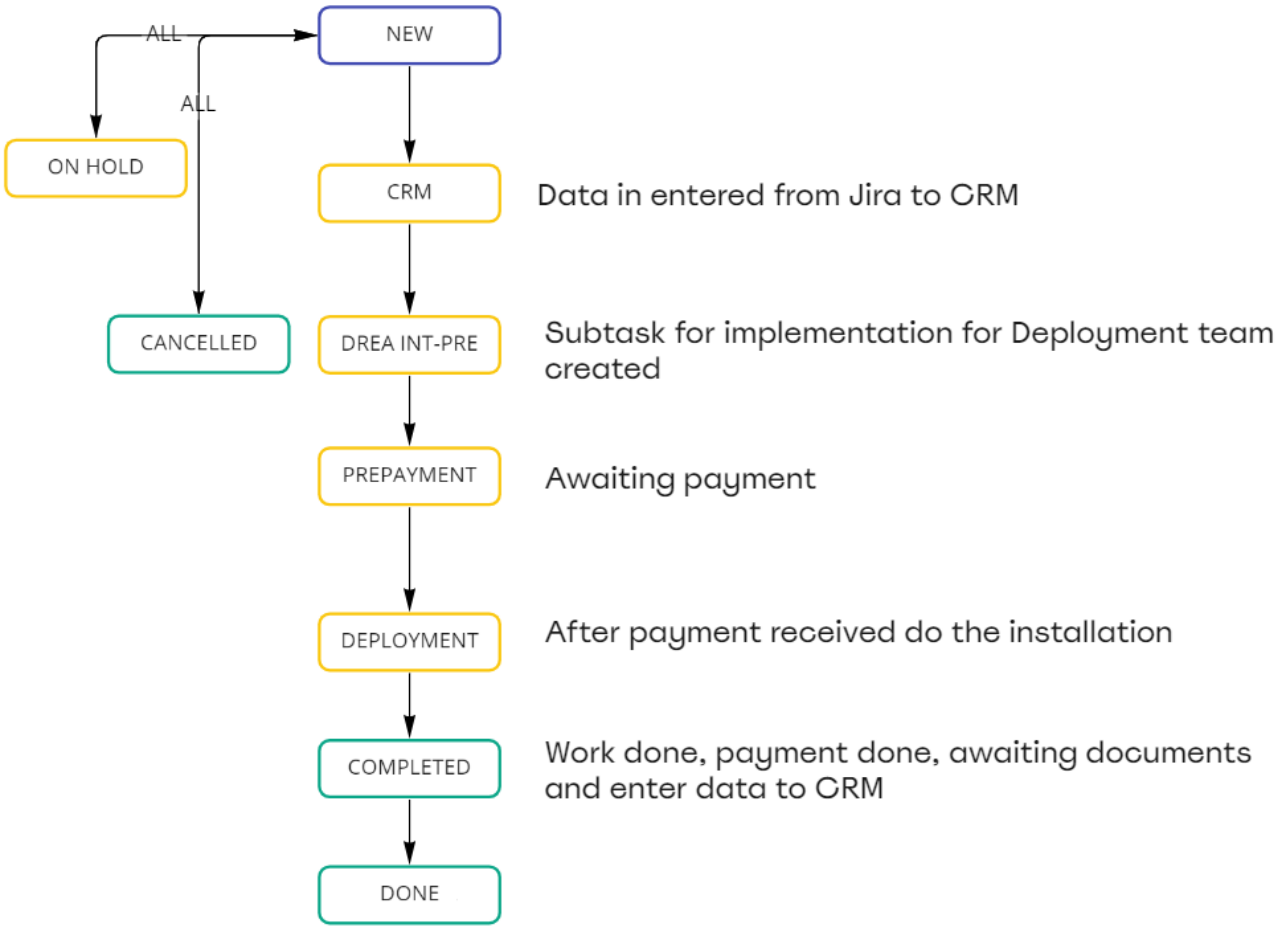

Figure 15. Integration with Pre Payment Agreement Workflow.

3.7.7. Request for Integration with Post Payment

AM-Integr Post (Analyzer) – request to integrate device to the system. Agreement has Post Payment condition to mitigate the risk of integration failure. Payment is done only after job is done. This workflow appeared after several failures to integrate obsolete laboratory equipment to the system. The company commits to try and takes money on success.

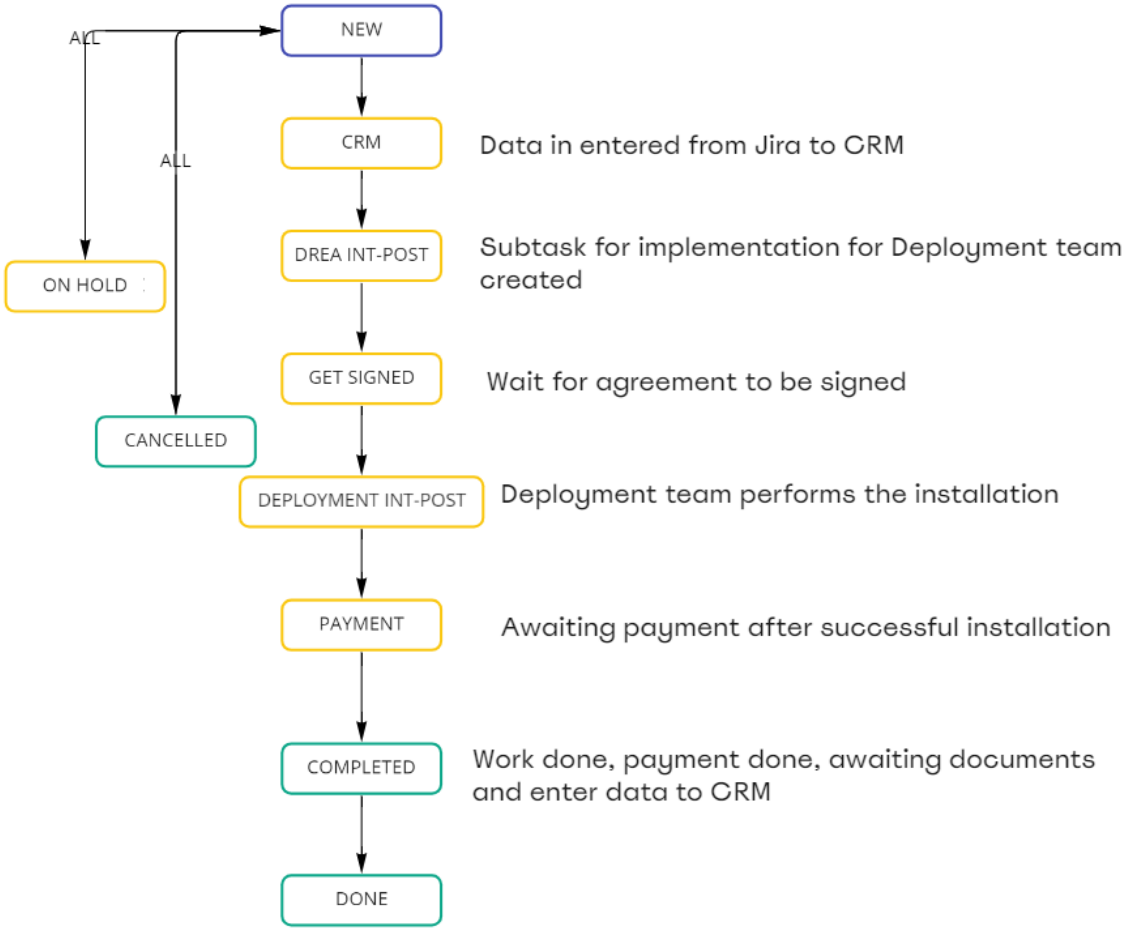

Figure 16. Integration with Post Payment Agreement Workflow

3.7.8. Request for Support Subscription

AM-Support – request to subscribe to support services. This task represents the process of signing and conducting the support agreement with the customer.

At the task creation initiator has to provide information about subscription plan, billing period (monthly or quarterly) and provide key responsible person on the customer side authorized to give tasks to the team. Is created by account manager or sale representative.

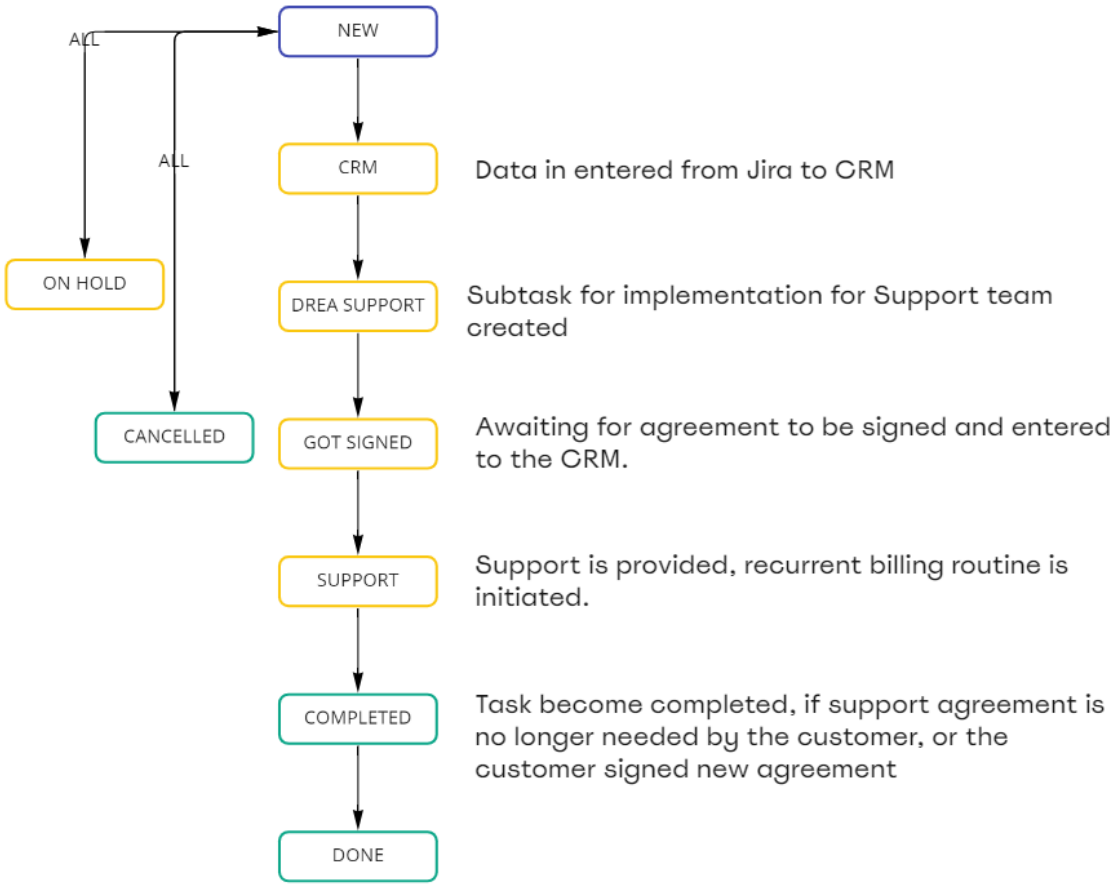

Figure 17. Support Agreement Workflow

3.8. Information Development

Information development team provides services in documentation of the products and providing different printed materials – instructions, release notes, guides, announcements, video instructions and other supplementary materials. Knowledge base for the customers was created as a web portal, and information development team is responsible for the information to be up to date.

3.8.1. Information Development Workflow

AM-Instructions – tasks to the information development team. One workflow was implemented for all information development related tasks.

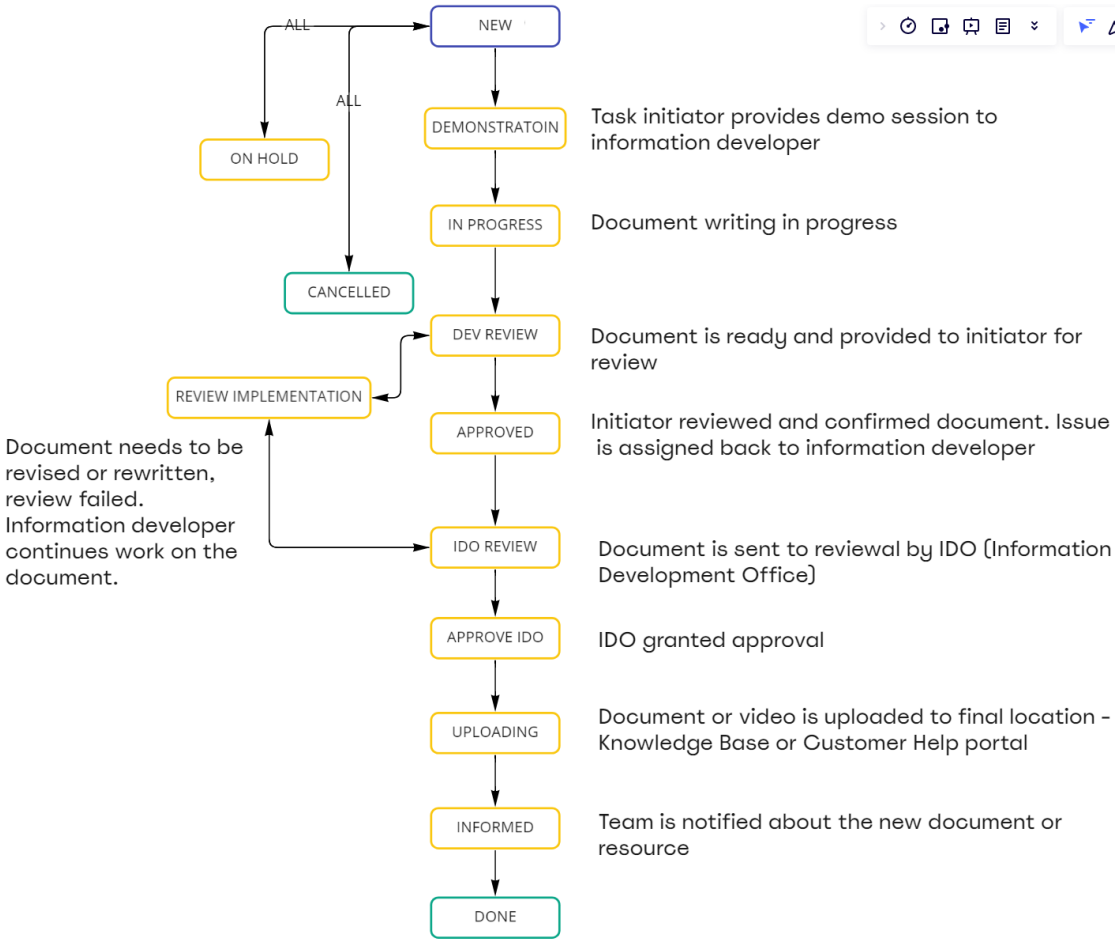

Figure 18. Information Development Workflow

3.9. Legal

Legal department works with agreements, and its work is mostly standardized. Agreement templates are created for every type of the product, templates are imported to the CRM system and basic agreement can be generated easily from the CRM. But there are requests to the legal department that cannot be standardized or predicted. The request can come from the customer, partner, governmental institution or just from the email. The process of handling such requests is described in Request for Agreement Workflow.

3.9.1. Request for Agreement

AM-Legal – this type of task is used, when nonstandard agreement have to be developed by lawyers. Hers come all partnership agreements, service agreements with external organizations, leasing, other legal binding documentation.

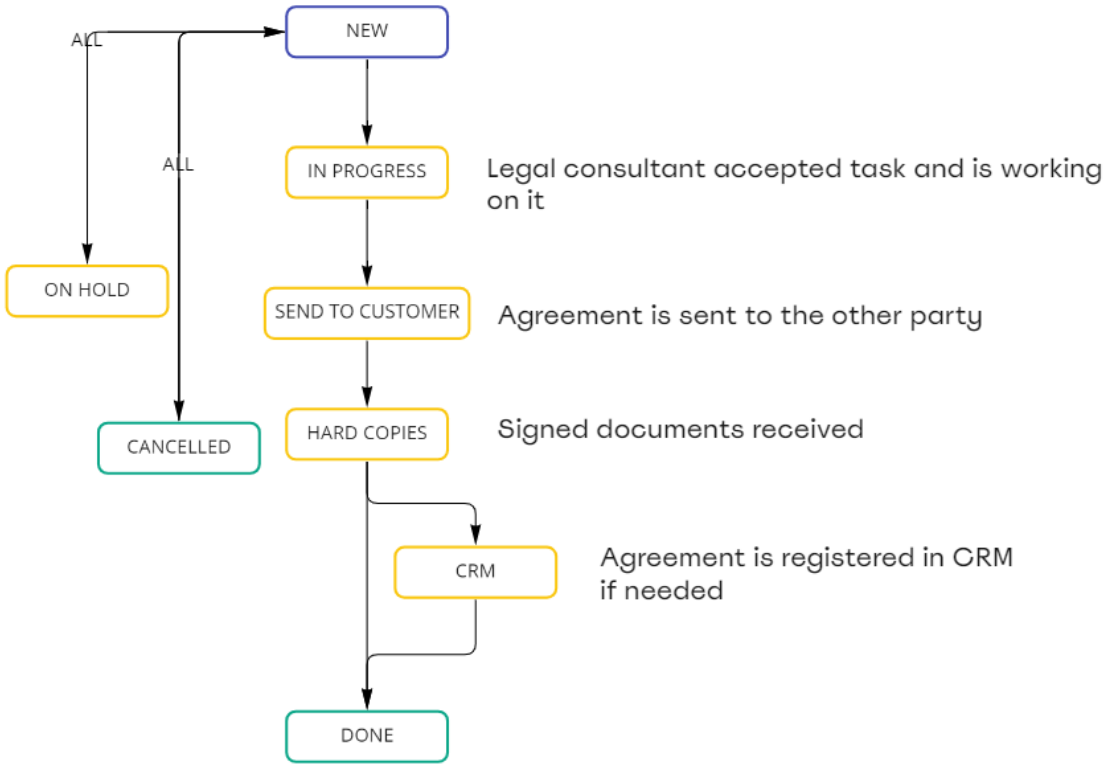

Figure 19. Agreement Workflow

CHAPTER IV. CUSTOMER RELATIONSHIP MANAGEMENT

4.1. Introduction

Business transformation started with the analysis of existing software and efforts to improve them. Reporting software Job Done was improved with several additional fields referencing Jira tasks and estimation process, Jira was extended with multiple workflows, but this did not help the company to achieve the goal – having all information in one place, data access control, registry of all agreements, products, pricing, billing rules in one place. New system, that will help the company to manage all of these processes is required. First decision was to get some industry standard CRM system, like Microsoft Dynamics CRM [6] or Sales Force [7], but that approach had following issues:

1. Personnel. The company doesn't have engineers familiar with those systems
2. CRM needs a lot of customization to be done in order to integrate with all software in place.
3. CRM modules are frequently asked by the customers, so we have to integrate with external systems and not propose ours.

General decision was to create the new software product – CRM, which will first cover needs of our company process automation, and in the future will become basis for the new module proposed to the customers. The great demand on the market for this solution was caused by war with russia. Widely used russian CRM systems occupied Ukrainian market, and now plenty of our customers seek for replacement of those systems.

The other goal of this development was general movement from one time permanent licensing to SAAS – scheme, when customers have to be billed for the products and services in automatic manner.

CRM system was build upon Doctor Eleks Mobile Platform – architecture approach described in Appendix A.

4.2. CRM Structure

Designed product is divided to the two general parts – internal CRM system and customer facing portal. CRM System integrates and automates processes related to business needs of the organization – holds the information about customers, product line, agreements, services, billing, and reporting.

Significant task for development is integration with existing systems in place – 1C, JobDone and Jira. Timesheets have to be imported from JobDone, then matched with task from Jira, reported time have to be taken from JobDone, but the type of the task, status and estimate – from Jira. Combined data provides monthly report for the customer, together with Invoice generated and payment accounted from 1C.

Let us enlist the modules, that have to be implemented for the system to operate.

4.2.1. Organizations

Organizations module in the CRM is not a simple dictionary. Organization represents entity, that can have multiple Companies (tax entities) and Departments.

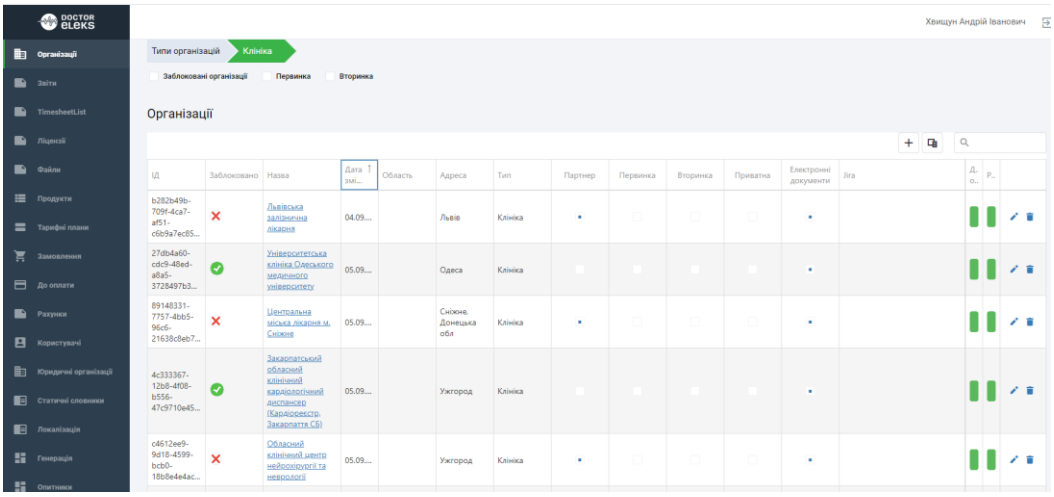

Figure 20.1. Organizations in CRM

Organization Type is the dictionary of our existing types of customers – Clinics, Insurance Company, Pharmacy, Partner, etc.

Organization Kind is more detailed dictionary, representing the specialty of the customer – Stationary Hospital, Plastic Surgery, etc.

Questionnaire holds basic information about the customer – quantity of employees, computers, devices, beds, required modules, etc.

Communication table holds summary of the calls, emails and agreements with the customer. Here we can relate in order to check what was the obligations, when and who did them.

Contact table stores information about customer's personnel, their contact information, positions and responsibilities.

Company represents legal entity, that can have the agreement. Some organizations have multiple companies, and we need to track legal agreements with them.

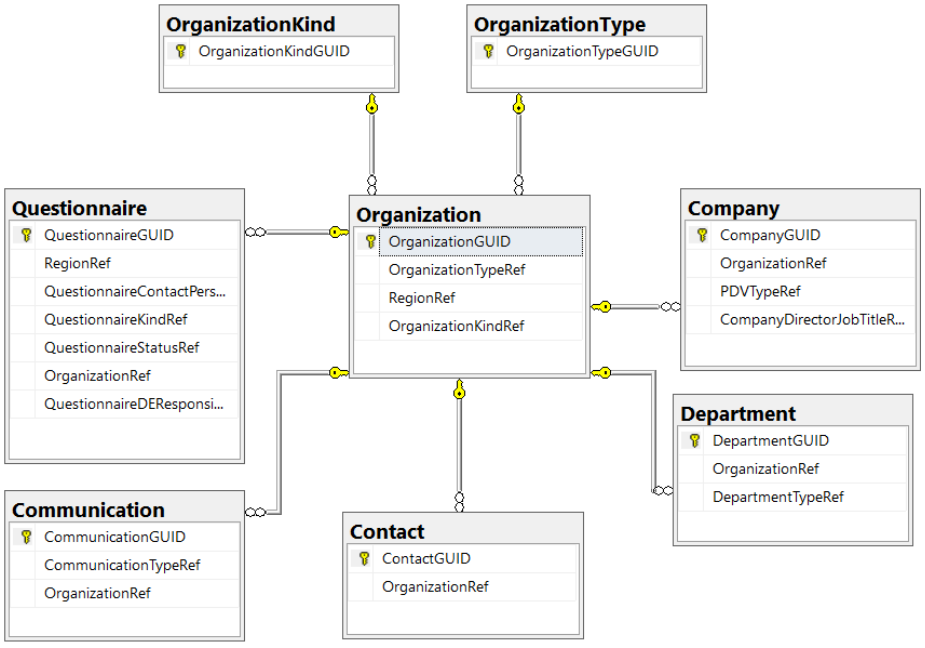

Figure 20.2. Organizations Structure

4.2.2. Products and Pricing

Products and pricing subsystem has to represent the complexity of company product line and pricing rules.

Product represents general product line of the company – solution for big institutions, solution for small institution, web and mobile application, solution for insurance company, etc.

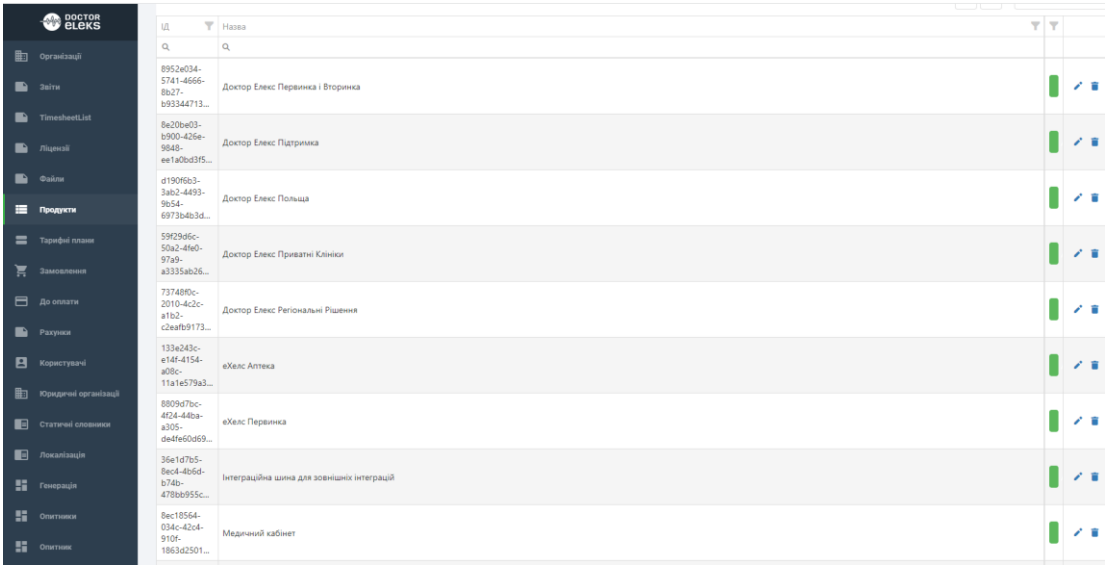

Figure 21.1 Products in the CRM

Service represents billing item – basic entity, on which agreements are created. Service inside the product can be: Custom Software Development, Permanent License for computer, Annual license for Web and Mobile application.

Every Service has reference to corresponding Service Units for billing automation.

Period Type is the dictionary for billing and invoicing periods. System currently supports Month, Quarter and Year as the Period Type.

Tariff Plan represents set of prices. Basic tariff plan contains prices, listed on the company web site. Custom prices for special customers are represented as different Tariff Plans.

Service Price stores pricing for the service. It contains all of the information for the billing – price, billing and invoicing periods, references to service, product and unit of product for the billing. Service Price has significant indicator – Is Recurrent.

Recurrent service price requires recurrent billing on timely manner.

The system also supports special Conditional Pricing. The details are stored in Service Price Condition entity. This represents prices related to quantity ranges of provided service – from 100 to 1000 one price, from 1001 to 2000 another. This system enables the company to provide volume-based discounts for the customers.

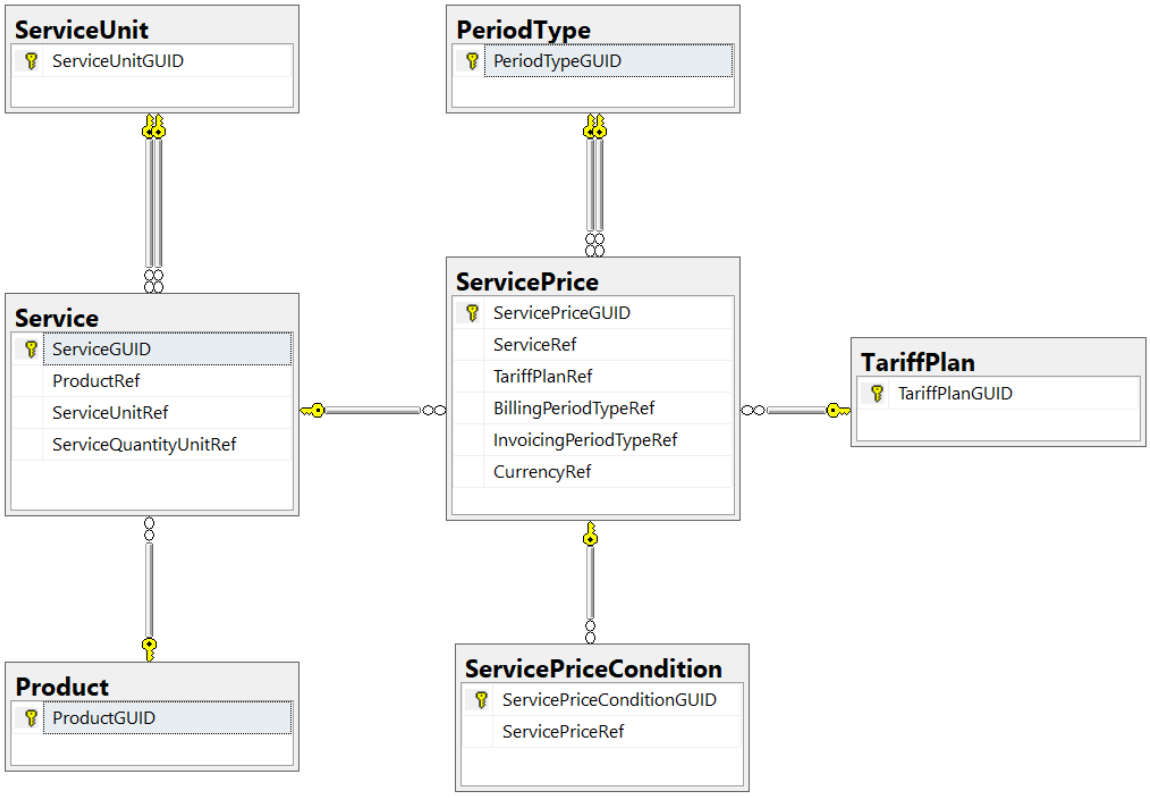

Figure 21.2. Products and Pricing Structure

4.2.3. Timesheets

Daily reporting is done in two systems – Jira, with the task details and JobDone – time tracking system for the company. Developers of those two systems provided API, that enabled us to import time reports into the CRM. Time reports have following attributes:

1. Date
2. Type – workflow from Chapter III
3. Login – identifier of employee reported
4. Project ID – identifier of the product, related to timesheet
5. Jira Status – latest status of the task
6. Start Time, Stop Time – exact timestamps from start till finish
7. Summary – description of work being done
8. Original Estimate – approved by customer in Jira estimate for the task
9. Total Reported Time – total hours, reported for this task in all timesheets by all employees.
10. Customer – identifier of the Organization for which work was done.

CRM imports timesheets on the monthly basis from Jobdone and provides interface to export the reports in excel format, containing all the data related to billing process.

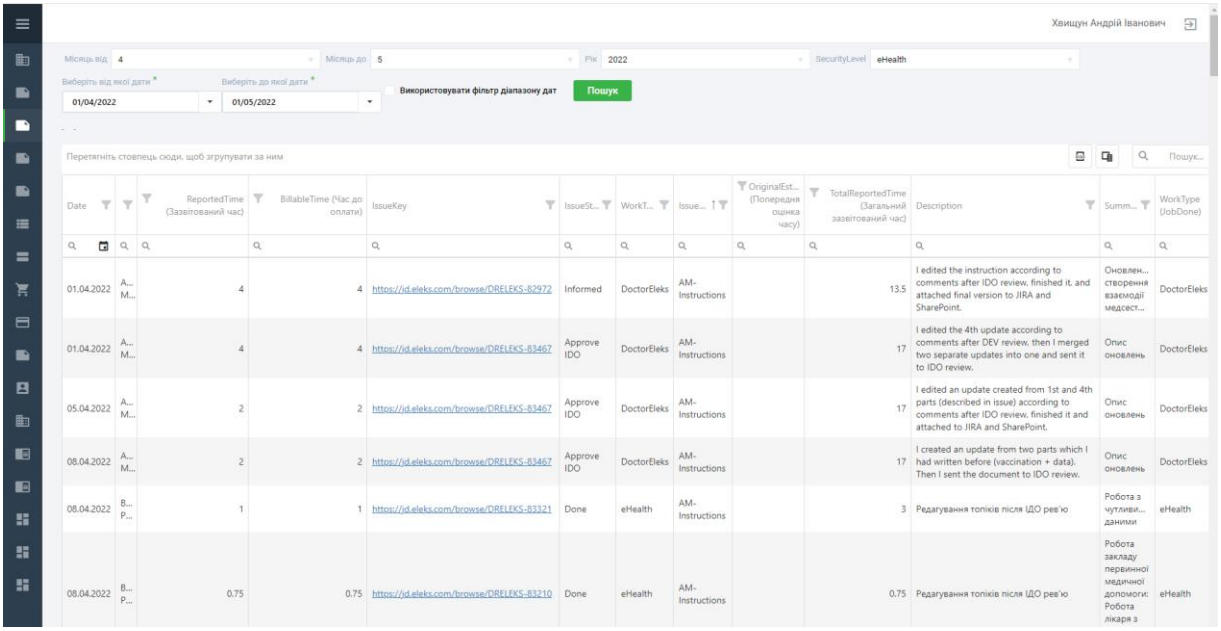

Figure 22. Time Sheet Monthly Report in CRM

4.2.4. Agreements and Bookings

CRM must contain information about the agreements with the customers. Data structures look like following:

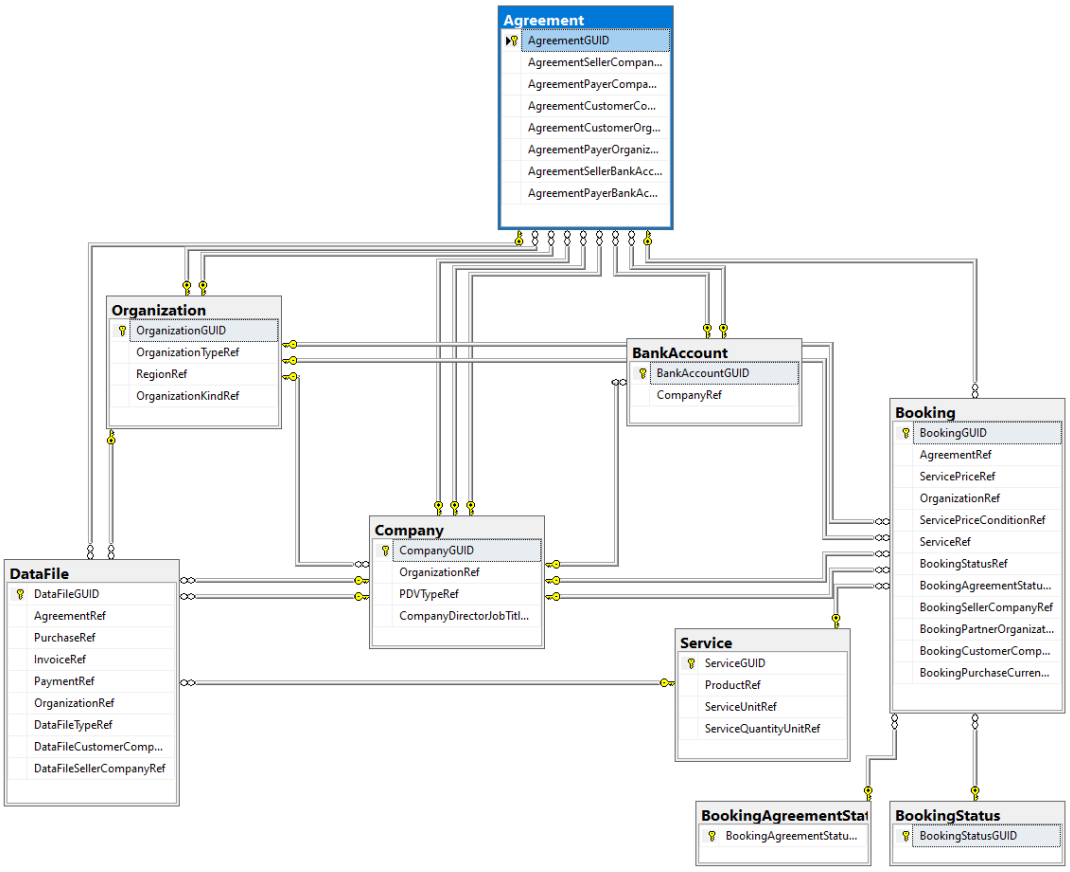

Figure 23.1. Agreements and Bookings

The process starts with registering of the Booking – intention to order product or service. Service Price, Tariff plan are selected on this stage. References to Company indicates legal entity, Product and Service – default agreement template. After all details are agreed with the customer, the data is entered to the CRM system.

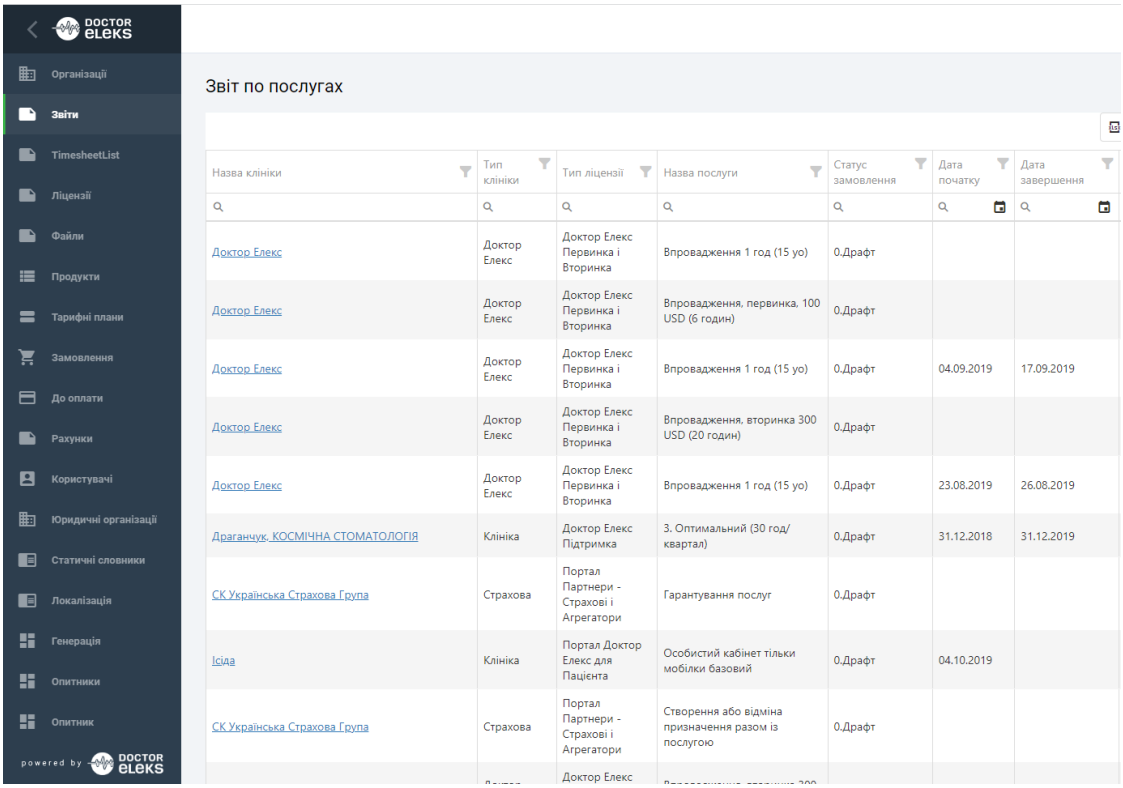

Figure 23.2. Agreements and Bookings in CRM

4.2.5. Payments and Billing

Payments and billing entities are presented at the following diagram:

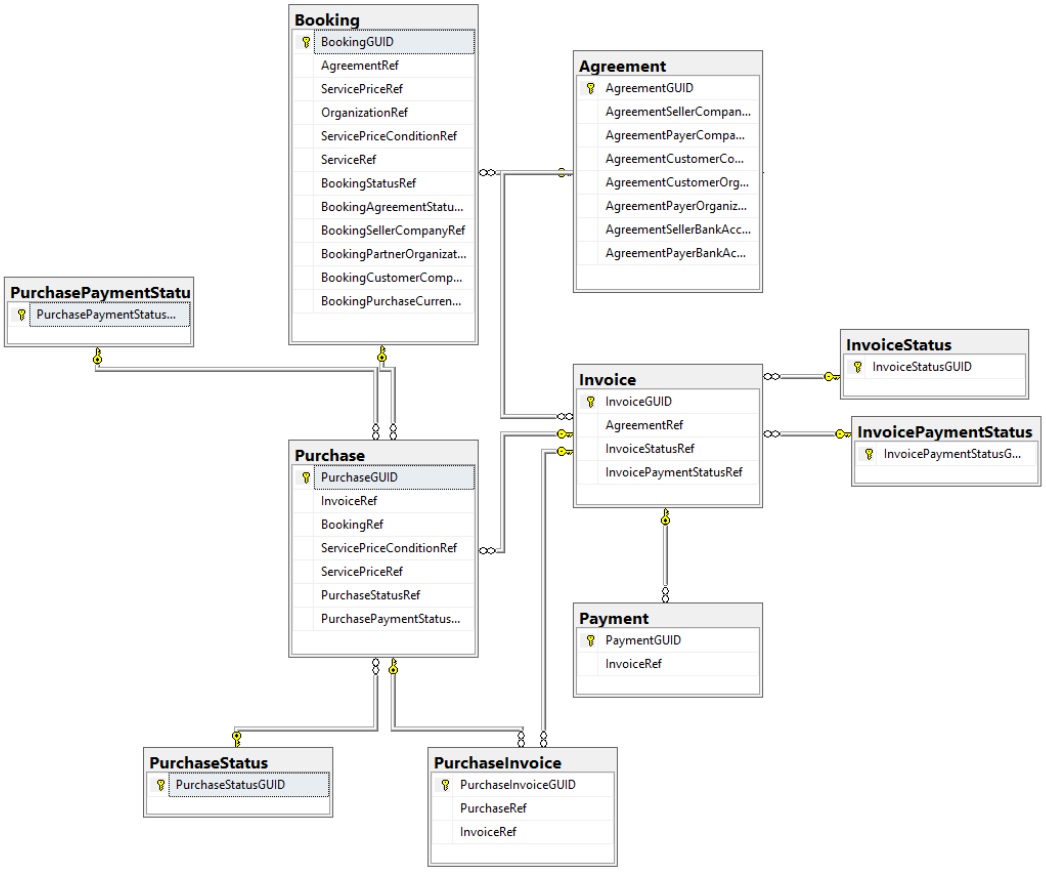

Figure 24.1. Payments and Billing

Automatic billing is implemented based on following entities:

1. Booking – registered order of some service with designated price
2. Agreement – legal entities, dates, status
3. Purchase – Purchase Order for particular period of time, indicated in Booking entity with Billing Period.
4. Invoice – Invoice for particular period of time, indicated in Booking Entity with Invoicing Period
5. Purchase Invoice – relationship between Purchases and Invoices – indicates, which Purchases were included in which Invoice.
6. Payment – actual Payment, imported from 1C Bookkeeping system

Automatic billing is complex system, integrating multiple information systems in order to provide proper invoices for the customer. CRM queries product portals and receives information about active product licenses. If license is active, but agreement is terminated, or payments are not received for 6 months, the license is exported to special report for termination.

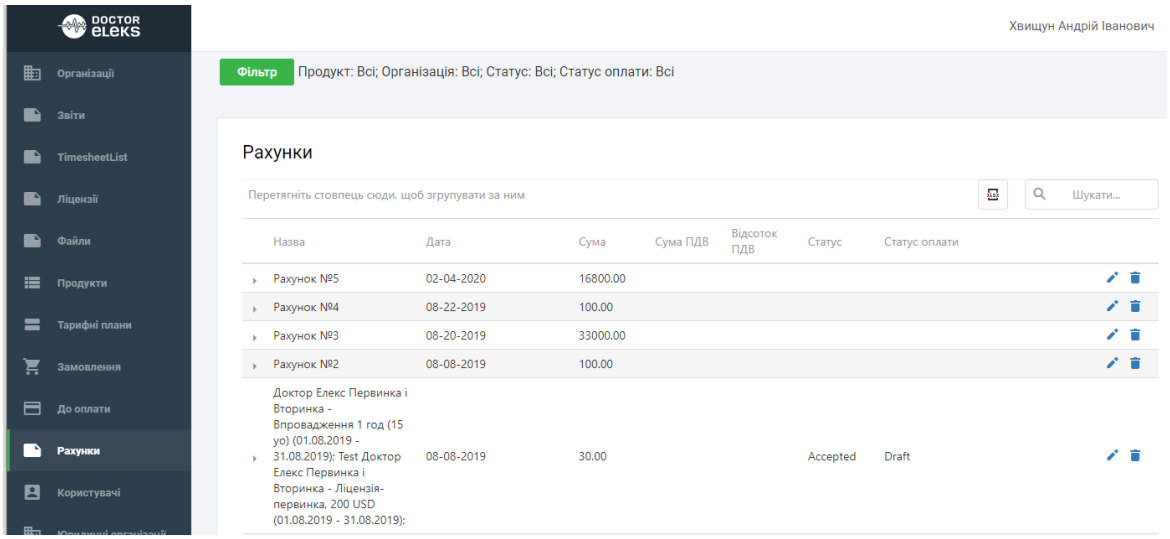

Figure 24.2. Invoices in CRM

4.2.6. User Access

User access control is crucial in business application. CRM contains sensitive data, and the level of access to this data must be thoroughly maintained.

Authorization data in stored in Person entity.

Position holds actual relationship between Person and Organization. Position can have 3 levels of access – Operator, Manager or Administrator.

Operator is limited to read only access of basic information about its institution.

Manager has access to financial data and is able to create new orders

Administrator can manage other user's access inside organization.

Master organization access control provides the access to all related functionality in the CRM system.

User Access rights support both parts of the product – access to the system by company employees and access to the system by customer representatives.

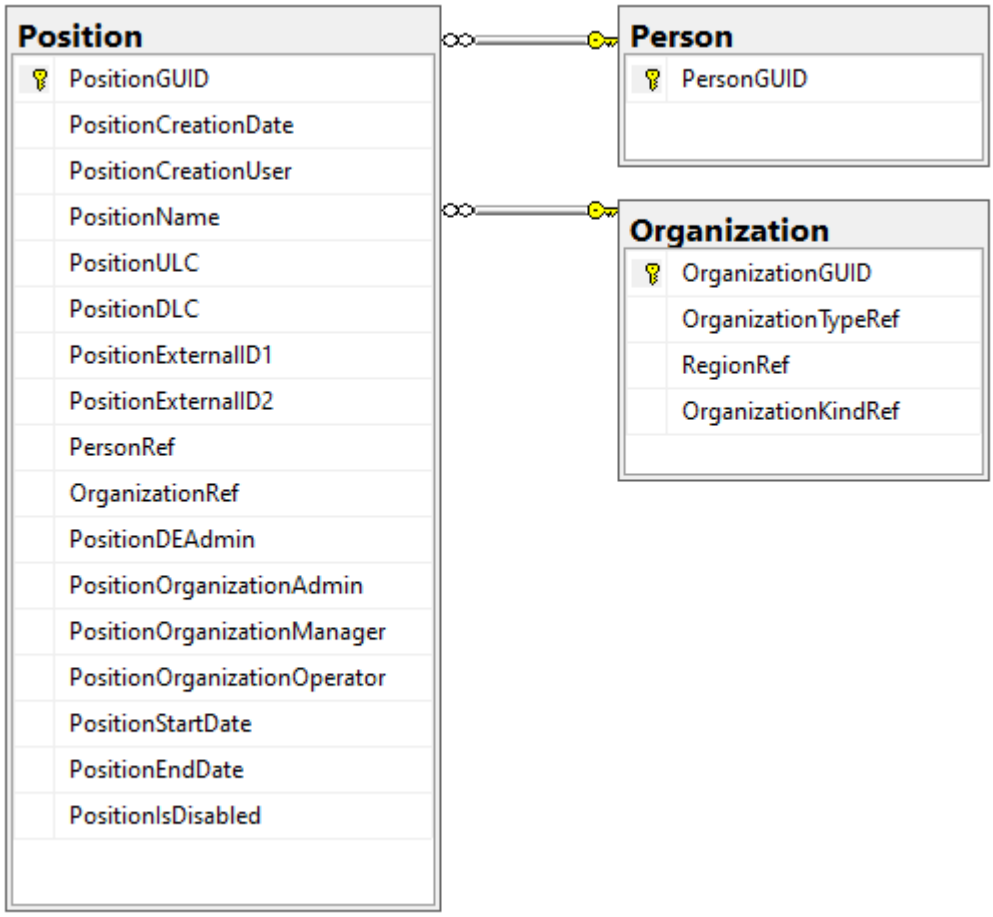

Figure 25.1. User Access

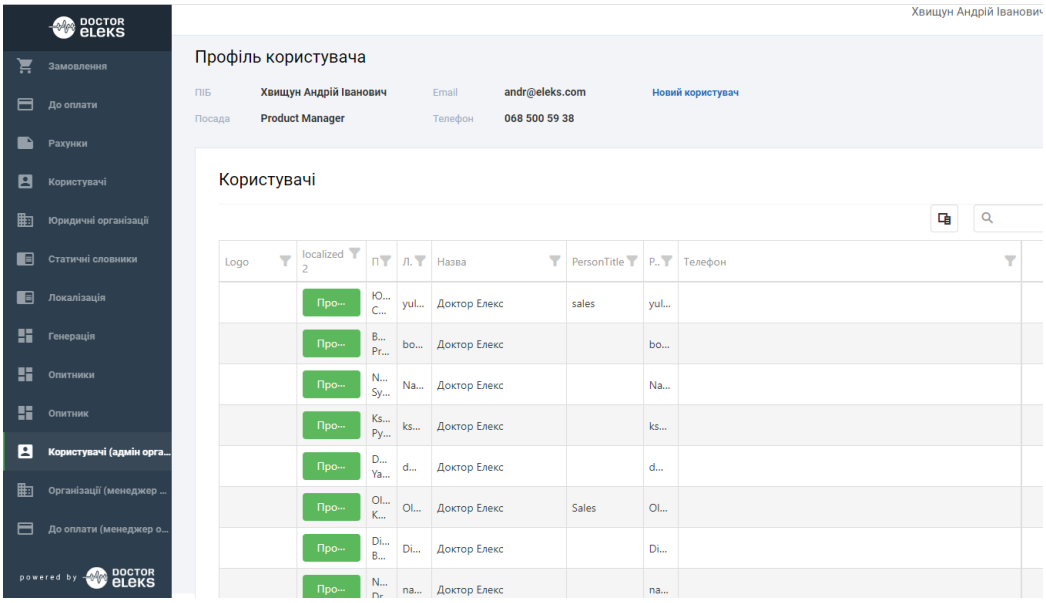

Figure 25.6. User Management in CRM

4.2.7. Licensing

Special system for software licensing was developed and integrated to the CRM. Licensing of the product is quite complicated, as it have to include the information, for every computer authorization to use particular modules of the system. License file is generated from the CRM and then placed on customer's server to enable its work. Product will be unable to launch without proper license on place.

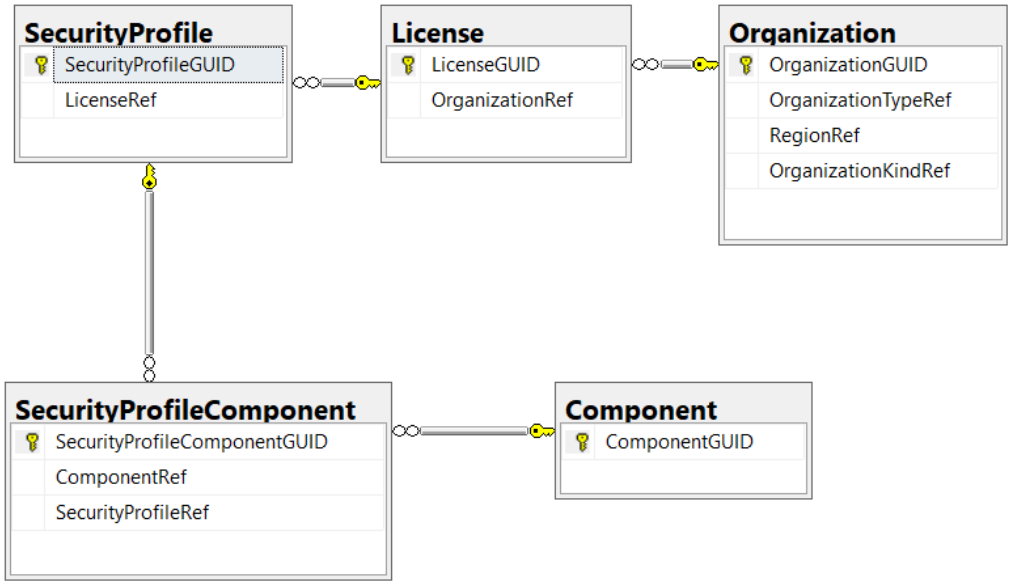

Figure 26.1. Licensing

Basic entities for licensing are Organization, License, Security Profile and Component.

Component represents module, that have to be available on customer's workplace.

Security Profile is general setting for the computer. It contains components using SecurityProfileComponent relationship table.

License groups several Security Profiles, enabling certain number of computers to work in the customer's network.

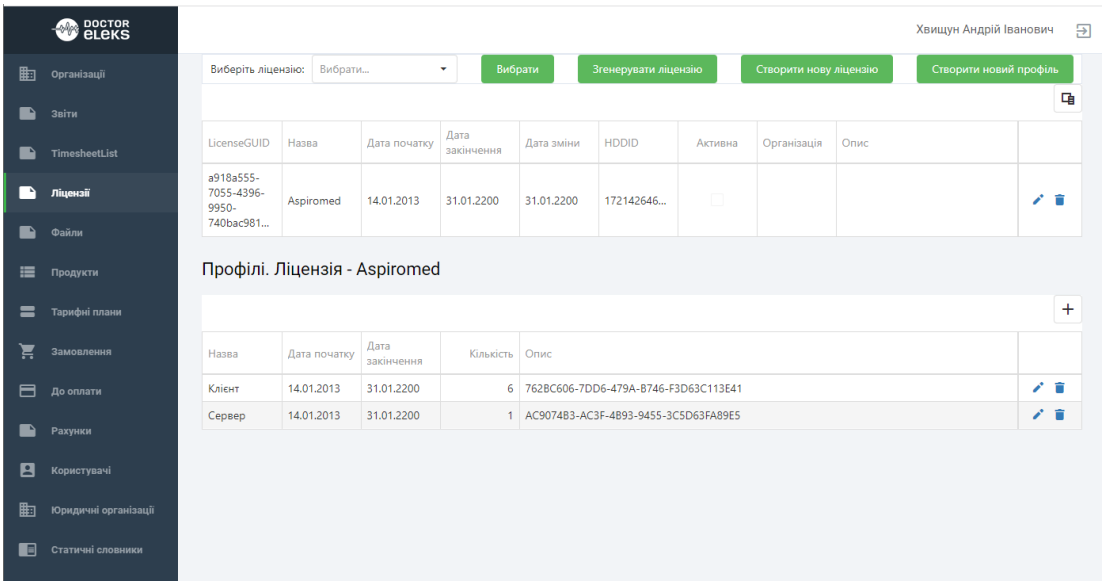

Figure 26.2. Licensing in CRM

4.2.8. Reports

Reports is crucial module in the CRM system. This module is actually the goal for the whole development – we gather information in order to analyze it. Reporting module is built upon custom queries, run over the database with designated filtering and security restrictions considered.

Reports in the CRM system are registered in special Report Query entity, holding all the metadata information about the report.

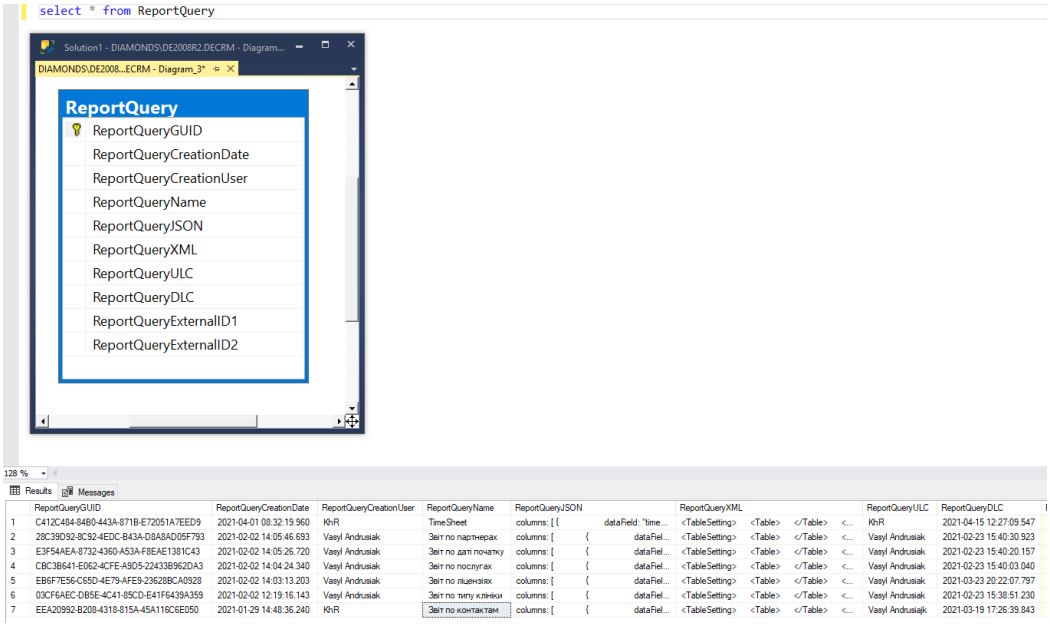

Figure 27.1. Report Query

Reports are ordered by management, account management or customers and developer have to implement the business logic for data extraction to the report.

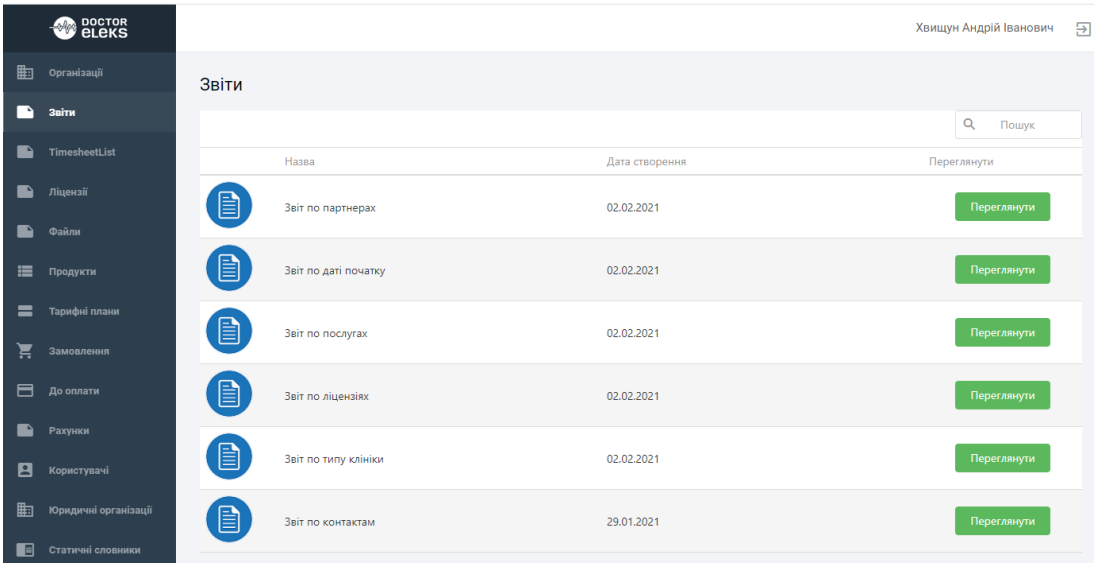

Figure 27.2. Reports in CRM

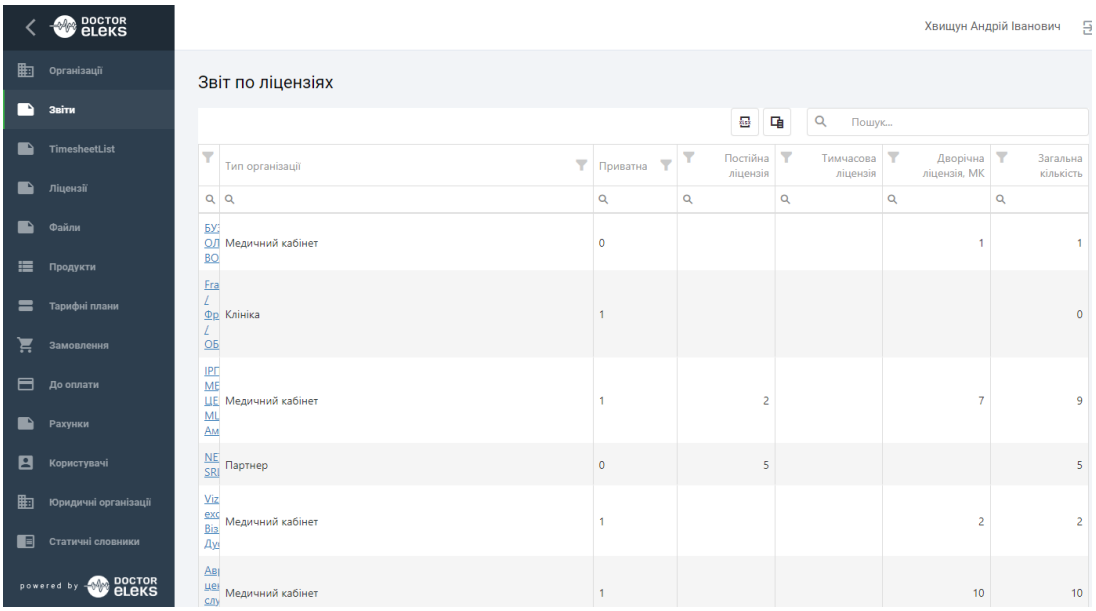

Figure 27.3. License Report Sample in CRM

4.2.9. Integration

CRM system required to be integrated with other systems for business automation.

1C is the accounting system holding actual information about payments, agreements and invoices. Prior to the transformation all of this information was entered manually. 1C developers have created special API for the CRM to be able to export billing information directly to accounting system. Invoices and Purchase Orders are generated on the timely basis from CRM into 1C.

Jira is task management system. CRM connects to this system using API and receives actual information about tasks – statuses, estimates, total reported time, customer, etc.

This information is merged with timesheet information from JobDone to generate comprehensive report for the customer and to provide statistical information for the management team.

JobDone development team also created API for CRM developers to be able to access reporting data of the company employees.

4.3. Customer Portal

The quantity of customers increases and direct communication between company management and customer's representatives is now hard to achieve. In the past, customer representative could just call and ask for the information, but now such a communication is impossible. This lack of communication and access to the information leads to frustration and bad customer opinion about the company. In order to provide to the customer the access to its profile, information about subscriptions, upcoming payments we are working on Customer Portal.

Actual module is now under construction. It will evolve together with further company transformation.

4.3.1. Customer Profile

Primary screen for the customer – customer profile with contain information about current agreements, payments due, balance, and references to the useful links to resources.

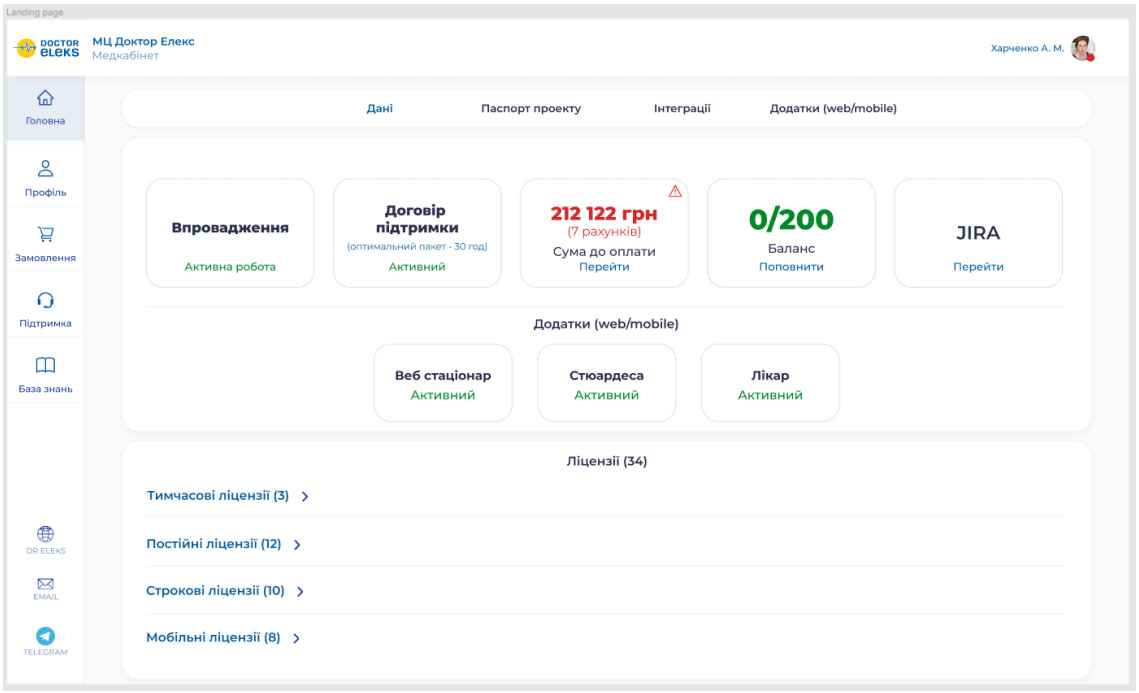

Figure 28. Customer Profile

4.3.2. Payments

Payments screen has to include quick and comprehensive access to all payment related data. We also plan to integrate payment gateway to the customer portal enabling option to pay bills directly from the portal.

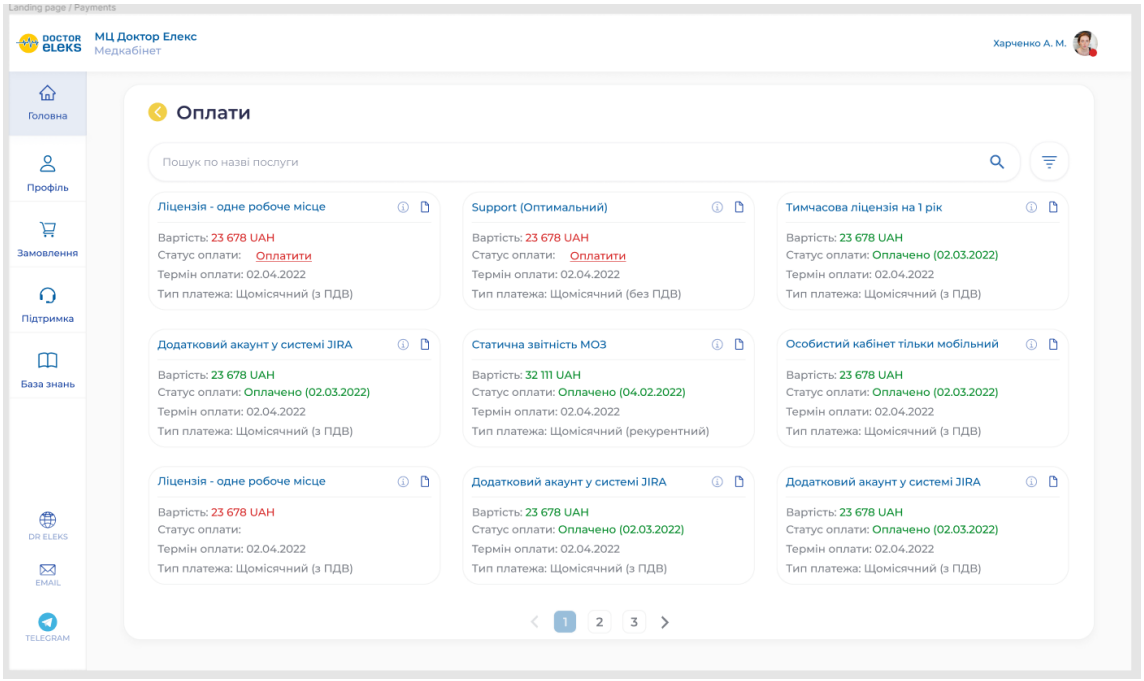

Figure 29.1. Customer Portal. Payments.

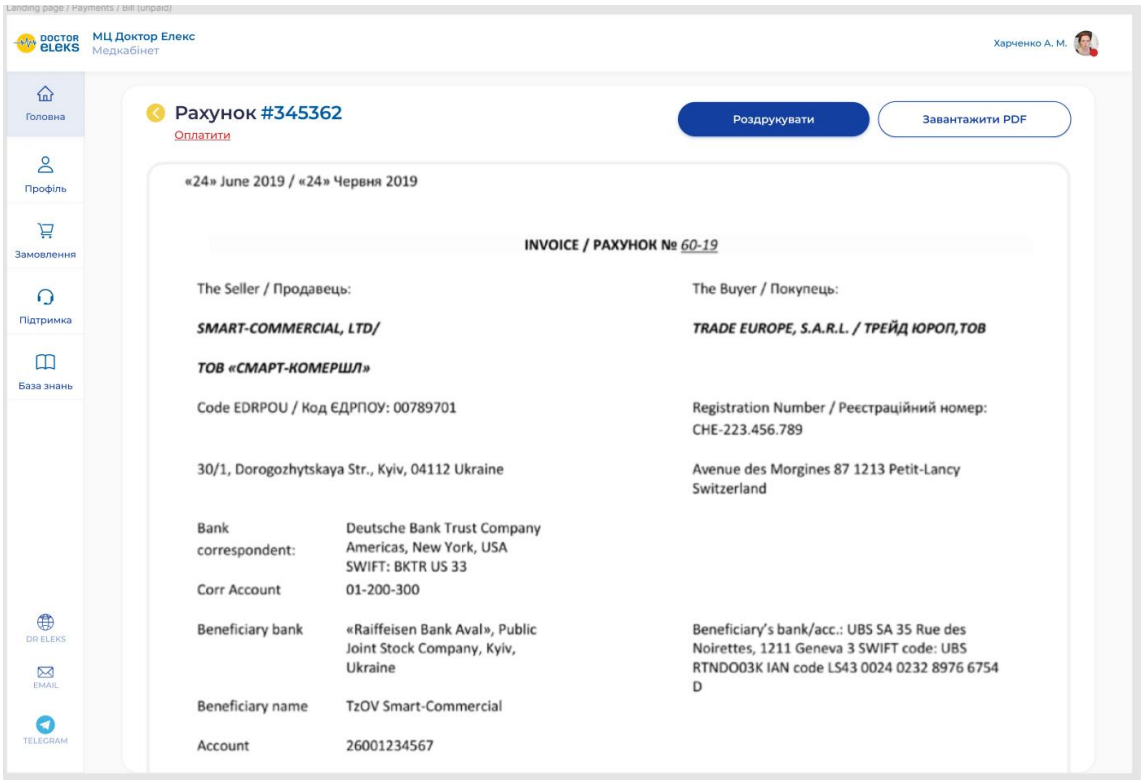

Figure 29.2. Customer Portal. Billing

4.3.3. Project Passport

Project passport contains information from Questionnaire, filled in by customer, and basic information about products and services installed. This screen also indicates responsible personnel and provides direct links to support engineers on the company side. Customer can review project passport and contact the company to make any changes.

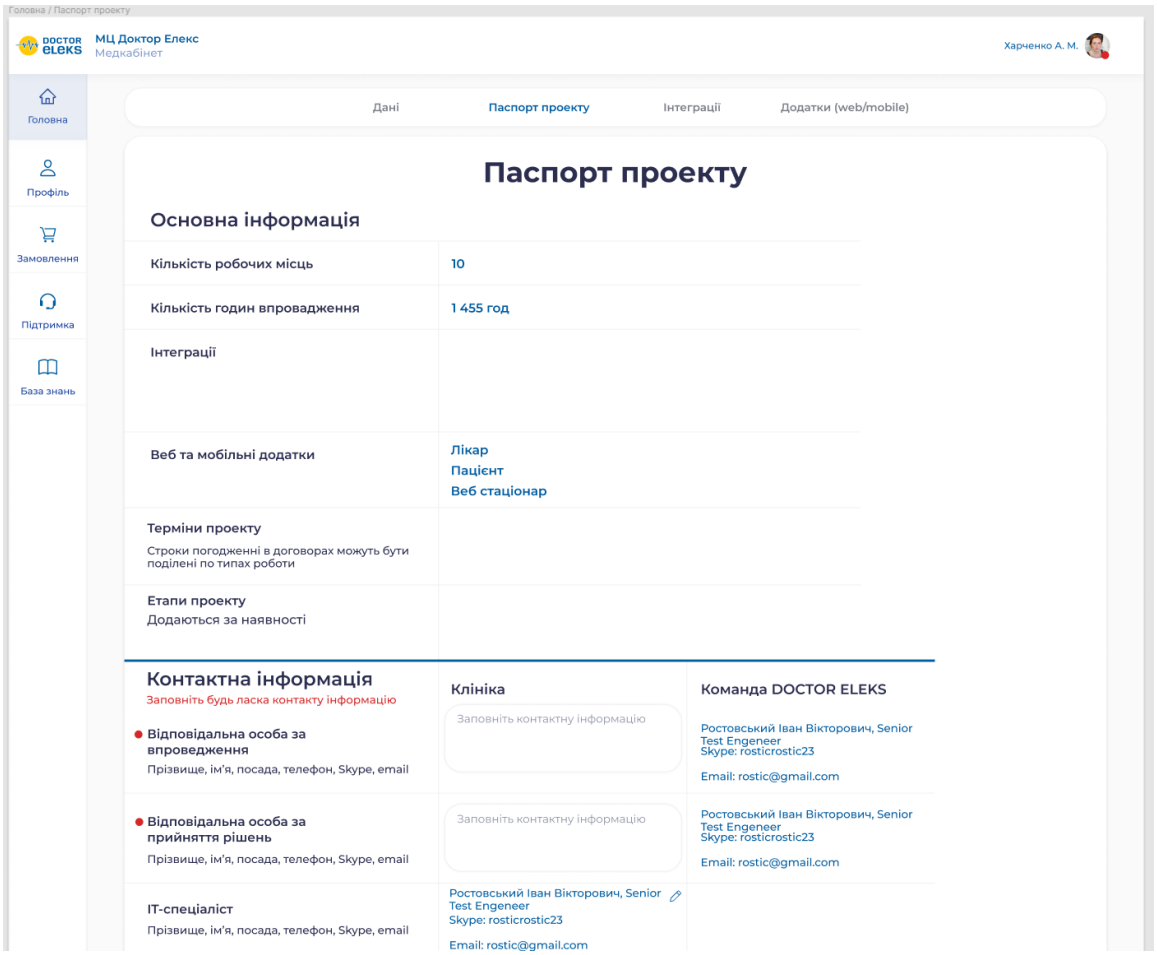

Figure 30. Customer Portal. Project Passport

4.3.4. Support Center

Support center provides direct access to support agreement information. It also contains useful links to Jira task management system, skype group for communication, support team schedule and support payment information. The screen also indicates that support agreement needed to be prolongated.

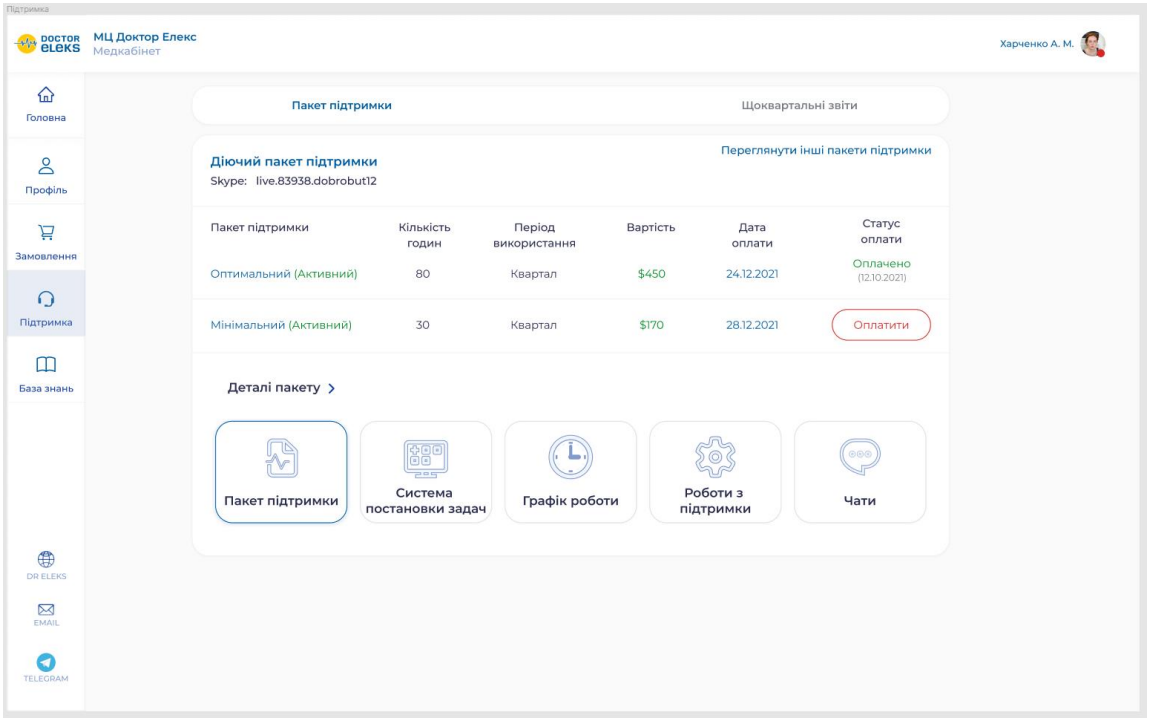

Figure 31. Support Center

4.4. CRM Project Estimate

4.4.1 Management team for scope definition

CEO – Chief Executive Officer. Responsible for project approval, goals statement, acceptance. Final decision maker.

COO – Chief Operating Officer. Responsible for accounting process definition, goals statement, data management.

CTO (author) – Chief Technology Officer. Responsible for architecture decisions, development project management, implementation.

BDM – Business Development Manager. Responsible for service and product structure, pricing information

Accountant. Responsible for task statement for integration with bookkeeping system, billing, and invoicing processes

CRM Admin. Responsible for data entry and data consistency. Defined the list of properties for contact information, organization and company structures.

4.4.2. Software development team

Project manager – Responsible for task control and team coordination (Author)

Database architect – Responsible for database structure and performance

Database developer – Responsible for SQL code development

UI/UX designer – Prototyping, user interface and user experience

Front End Angular (CRM) – Front end developer for CRM system

Front End React – Front end developer for Customer portal

Backend – Server developer responsible for data interaction between system components

Integrations – web API developer integrating external systems

QA Engineer – general quality assurance and control

4.4.3. CRM Estimate

Estimation was done based on project scope decomposition and estimation session together with the team. Total 149 workdays with estimated cost of $ 22 350 and duration of 80 workdays was scheduled for the project.

	Project Manager	Architect	DB Developer	Integrations	Back End	Front End	Designer	Quality Assurance
CRM - Architecture	5	5	5		5	5	5	
Organizations	1	1	5		2			2
Products	1	2	2					1
TimeSheets	2	1	2	2				1
Agreements and Bookings	1	2	3					1
Pricing	1	1	3					1
Orders	1	1	3					1
Payments	1	2	5	5				5
User Access	1	1	1	1				1
Reports	3		5					5
Licensing	1	1	5	2				2
Billing Integration	1	2	10	10	5			

Figure 32. CRM Estimate Decomposition

4.4.4. Customer Portal Estimate

Estimation was done after design phase finished on the estimation session together with the team. Total 135 Workdays with estimated cost $ 20250 and duration of 60 workdays was scheduled for the project.

	Project Manager	Architect	DB Developer	Integrations	Back End	Front End	Designer	Quality Assurance
Customer Portal - Architecture	5	5	5	5	5	5	5	
Profile	1	1	5	3	2	4	2	2
Passport	3	2	5	2	2	5	3	3
Licenses	1	1	5	2	1	3	3	2
Support	1	2	3	1	1	3	2	3
Payments	1	2	3	1	1	5	3	5

Figure 33. Customer Portal Estimate Decomposition

4.4.5. Total project timeline and budget

Total cost of project development stated $42 600

Cost was calculated based on 284 workdays of software development team with avg $3000 monthly salary per 20 workdays.

Project duration was estimated to 140 workdays. Duration estimation included the fact, that development team member can be involved in other projects during development lifecycle, which will lead to duration increase.

EXECUTIVE SUMMARY

PROBLEM/OPPORTUNITY STATEMENT

Product company becomes mixed product and service company, when the product is complicated and requires support for the customers. Company grow, the number of tasks and customers increase, and proper management of all of the assets and resources become crucial. The aim of the project is to provide comprehensive framework for such a company, addressing most of the important questions and allow management and owners to get predictable and manageable environment.

TECHNOLOGICAL/BUSINESS COMPONENT

Technological component is creation of CRM product serving the company as asset management tool. Integrate the data from existing company resources and allow customers and management team to utilize business automation tools.

Business component incudes digital transformation of existing business, optimization of the management processes and decision making. The project also allows to automate processes, that currently are being done manually (billing, statistics gathering, product management).

PROJECT GOAL STATEMENT

Develop business transformation framework for mixed product and service company. Identify, optimize and tune business process automation tools to resolve existing company issues, identified by analysis

PROJECT SCOPE, STAKEHOLDER AND ROLE

Scope of the project

Framework, defining organization Structure, product development approaches, support routines,

Project started with series of strategic sessions, which further expand to changes in company structure, processes and approaches. Business related data is collected in specially designed CRM, providing the ability to automate billing for both product and service components.

Project scope includes distinguishing of the basic roles and designation of custom workflows for every role and employee.

The stakeholders are: executives of the company, managers of the departments, company employees, customers and partners.

As the CTO and one of the founders of the company I am responsible for product development, people assignment and processes optimization. My daily job is the development and support of products for customers. Intention of this project is to improve processes in my company, understand the rules, develop the patterns, and create the framework and CRM product, that will allow further to manage the companies of the similar nature. Similar approach can be utilized for any product development team.

PROJECT OBJECTIVES

The main objective is to conduct company transformation and growth using business automation tools.

Deliverables of the project include

Organizational structure description, definitions of business processes inside the organization.

Description of digital transformation process inside the company.

CRM product for process automation.

MILESTONE SCHEDULE/METHODOLOGY

Stage 1. Business analysis and investigations

2 month from the start

Need to involve company management to collect the data

Stage 2. Business model building

2 month from the finish of Stage 1

Need to involve company management for model validation

Stage 3. CRM Solution development

2 month from the finish of Stage 2

Need to involve software developers for implementation

Stage 4. Project finalization and documentation

2 month from the finish of Stage 3

PROJECT CONSTRAINTS

The limitation is the current workload of the company and ability to invest resources to digital transformation project.

SUCCESS CRITERIA

Business analysis stage will have to provide business processes descriptions

Business process building stage will have to provide business process with description of the processes for all roles of company employees

Solution development stage has to provide CRM product, integrated with the solutions and products of the company, allowing to simplify management tasks and decision making. It has to include the data about customers, projects, orders, services, prices, typical agreements and documentations and also have to automate billing process.

RESOURCE REQUIREMENTS, ACADEMIC MENTORS

Management team availability and readiness to cooperate. Development team availability and investment from the company to the development process. Hosting for CRM project. Consultants from LVBS availability.

PROJECT ASSUMPTIONS

Project assumes, that there already exists the company providing both products and services, and the company needs the framework for business transformation for its day-to-day operations. Some automation is already in place, but significant areas of management decision making is not yet properly covered. It is also assumed, that the company is ready to cooperate and implement digital transformation plan designed in this proejct.

PROJECT RISKS

Risks include lack of resources – when current projects and obligations to the customers will have higher priority that internal project for digital transformation. There is also risk of loosing key team members, which will make much harder the implementation. The last but not least risk is to develop something that will not be completely useful for the company.

PRELIMINARY CONCLUSIONS

The project has high demand and importance for the business. Even basic features of the CRM allowed to optimize the process of customer management and product management. Having everything included in one system, with ability to analyze and support business decisions will allow to optimize resources utilization and will lead profit increase.

CONCEPTS AND INSIGHTS USED FROM THE STUDY

Most of the concepts, studied during the course are highly utilized. Business as a system course allowed to get clear view of what company have to be and compare it with the current state.

Leadership and management 3.0 course clarified the proper approach to team involvement and organization building.

Course on finances allowed to analyze the business from financial perspective.

Business process modeling course provided the tool for processes description and enforcement

This project is the summary of the whole study during the program, and as a summary it involves all the knowledge received.

I am very grateful to instructors, LVBS and MSTM Program for the opportunity to study and to improve business practices together with development of the CRM product, which can be further reused for other businesses.

Appendix A. Doctor Eleks Mobile Platform Architecture

Terms and abbreviations

DE: Doctor Eleks's (backend) services

DB: Microsoft SQL Database Server.

IB: (Integration bus) Doctor Eleks Internal API gateway

SSR (server side rendering): Backend service which renders the HTML pages.

High-level Diagram

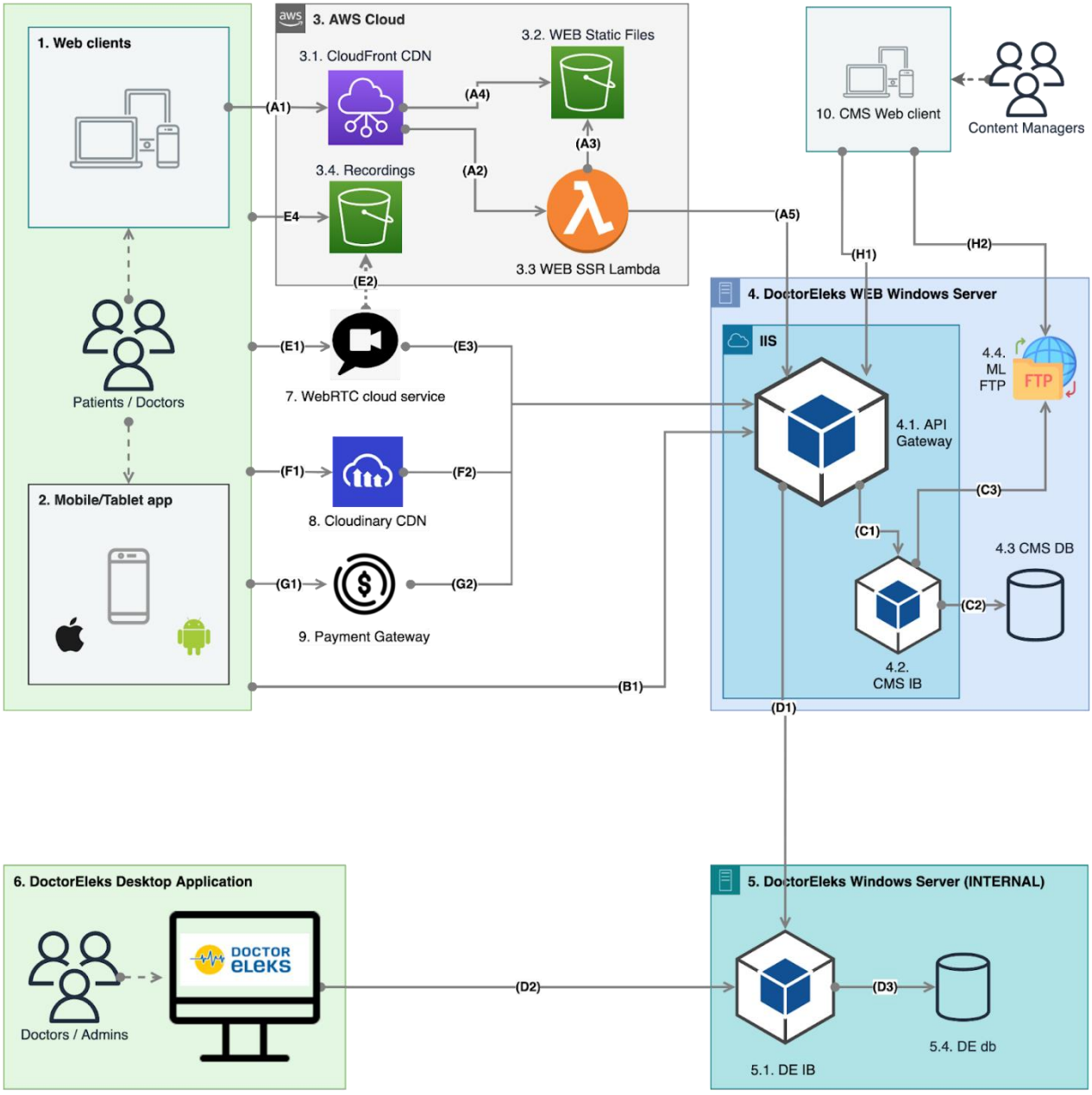

Figure 33. Doctor Eleks Mobile Platform Architecture Diagram

Components

№	Description	Technologies / Protocols
1	**WEB-clients:** modern web browsers	React Native Web, SPA / SSR
2	**Mobile Devices** - iOS and Android based phones and tablets	React Native, Expo
3	Amazon Web Services (AWS)	
3.1	**Cloudfront**: CDN in front of the hosted web services (SSR, Static files)	HTTPS
3.2	**S3:** Static WEB Files Hosting (SPA scripts, css, fonts, etc.)	
3.3	**Lambda:** NodeJS Server Side Rendering service	
3.4	**Recordings:** S3 storage for video calls recordings	
4	Services located on the DoctorEleks's on-premise server	OC: Windows Server
4.1	**API Gateway**: API server which aggregates data from internal DoctorEleks's API with the CRM content	.net-based HTTP service
4.2	**CRM IB**: API Gateway for CRM CRUD operations	.net-based HTTP service
4.3	**CRM db:** CRM database	MSSQL server
4.4	**Media Library FTP:** media files storage (images, videos)	FTP
5	Services Physically located on the on-premise internal server	OC: Windows Server
5.1	**DE IB**: Main API Gateway	.net-based HTTP service
5.4	**DE db:** Doctor Eleks's main database	MSSQL server
6	Main Doctor Eleks desktop application	.net Windows application
7	**WebRTC cloud service.** Any 3rd-party video conferencing service	HTTP, WebSocket, WebRTC

8	**Cloudinary:** CDN for fast and efficient images transformation, caching and delivery	HTTP
9	**Payment gateway:** Any 3rd-party payment gateway	HTTP
10	**CRM Web client:** CRM web client application	Angular / HTTP

Connections and interactions

(A) Initial HTML page request

(**A1**) Web client calls the CDN service

(**A2**) The CDN service calls SSR lambda or returns cached version of the page

(**A3**) SSR lambda fetches HTML template from S3 storage

(**A4**) SSR lambda retrieves all necessary data to render the page

(**A5**) The CDN service fetches all necessary static files from the S3 storage

(B) Mobile and Web clients interactions with WEB API Gateway

(**B1**) Mobile or Web client (SPA) requests data from API Gateway

(**C1**) The WEB API Gateway service retrieves all the necessary data from the CRM database or media library

(**D1**) The WEB API Gateway service retrieves all the necessary data from the main Doctor Eleks's server

(C) API Gateway interactions with the CRM services

(**C1**) API Gateway calls the CRM API service

(**C2**) The CRM service retrieves data from the CRM db

(**C3**) The CRM service retrieves media files from the media library

(D) Interactions with the main Doctor Eleks's API server

(**D1**) The WEB API Gateway service retrieves all the necessary data from the main Doctor Eleks's server

(**D2**) Desktop applications calls the the main Doctor Eleks's server API methods

(**D3**) Main Doctor Eleks's server retrieves data from the database

(**E**) Video Calls

(**E1**) Mobile or WEB client joins a video call

(**E2**) The video call recordings are saved to the AWS S3 storage

(**E3**) WebRTC cloud service calls the WEB API Gateway's web hooks

(F) Images delivering

(**F1**) Mobile or WEB client requests images from Cloudinary

(**F2**) Cloudinary retrieves the image from the WEB API Gateway if it doesn't exist in the cache

(G) Payments processing

(**G1**) Mobile or WEB client finishes the payment

(**G2**) The Payment Gateway calls the WEB API Gateway's web hooks

(H) CRM CRUD

(H1) CRM Web client calls the WEB API Gateway to update the content

(H2) CRM Web client uploads images to the CRM FTP server

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