Faculdade de Engenharia da Universidade do Porto

Intercompany

Group X

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1. Project Overview

This project consists in the development of a customizable interface to handle all the transactions between two different companies. It is important to clearly show past or ongoing processes between the two companies, so that the flow between them is noticeable.

The interface should host and display detailed data about all operational aspects of the transaction, such as stock, product categories, and vending platforms.

Another fundamental feature of the project is providing a user-friendly experience that allows the user a better understanding of the sales-purchase flow.

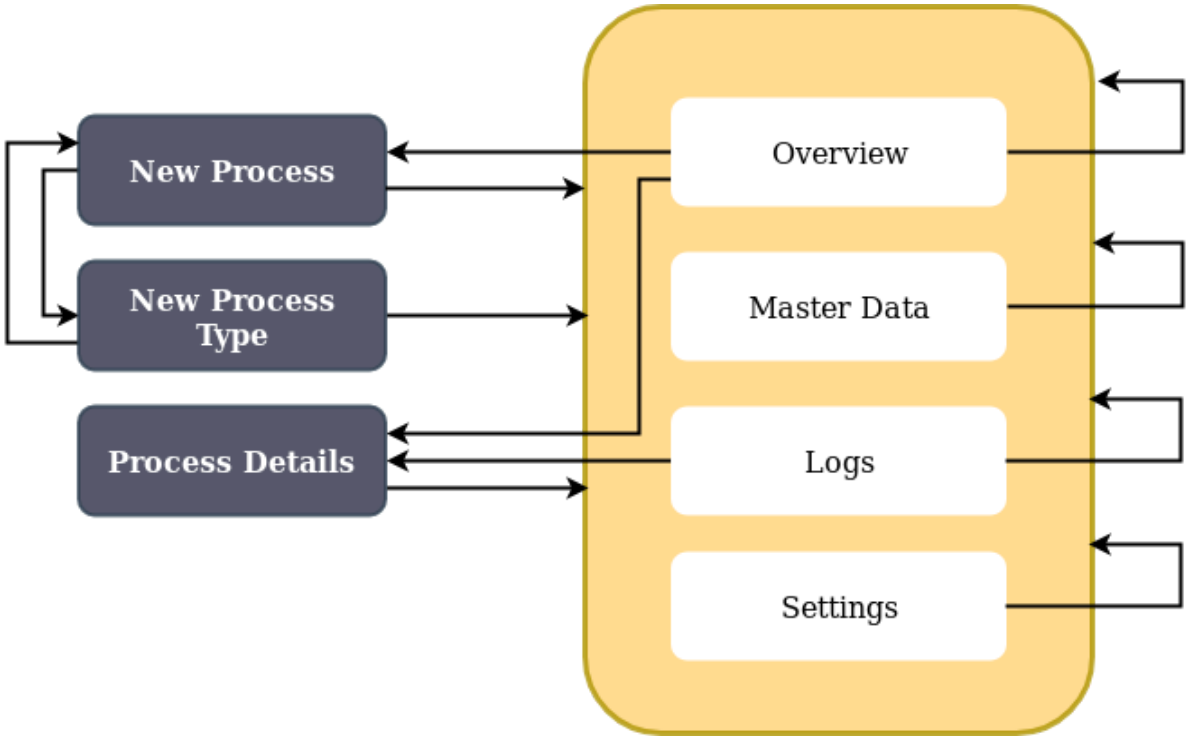

Image 1: Site map of the project

To better demonstrate all the functionalities of the application, there were defined two companies belonging to the same group. These two companies are *MetroCarpetFactory* and *MetroCarpetDistributor.* The first manufactures the products, such as carpets and rugs and sells them to the second. On the other hand, the second distributes these products and owns the machines that the factory uses, renting them to *MetroCarpetFactory*. These companies were not replicated on Primavera's Jasmin Platform, as the companies used had

different names. However, through this report, these conceptual organization names were used to easily illustrate the chosen scenarios.

2. Functionalities

2.1 Overview

Functionality	Description
Visualization of Processes	List state of the processes between the two selected companies, and their respective state, ID and timestamp
Add New Process	Option to go to the “New Process” page that will allow to create a new process

2.2 Master Data

Functionality	Description
List Company Products	Tables with the ID and description of the products that belong to each company
Product ID Correspondence	Table with the ID correspondences for the products present in both companies
List Company Entities	Tables with the ID and name of the entities that belong to each company
Entity ID Correspondence	Table with the ID correspondences for the entities in both companies
Filter Data Category	Allows to filter the information shown in the tables

2.3 Logs

Functionality	Description
Processes State	Check the status of all the requests made to *Jasmin* in order to complete the processes
View replicated documents’ natural key	Check the natural key of the documents replicated by the application

2.4 Settings

Functionality	Description
Modify Organization ID	Allows to change the organization ID
Modify Tenant Code	Allows to change the tenant code
Modify Client ID	Allows to change the client ID
Modify Client Secret	Allows to change the client secret
Change Organizations	Permits to add, edit and delete companies of the same group, to the application

2.5 New Process

Functionality	Description
Select Process Type	Choose the process type of the new process
Choose Companies	Allows to choose which companies are involved in the process
List Process Type Steps	Table with a list of all the steps of the selected process type that shows all of its specifications and flow
Add New Process	Allows to confirm the new process, thus creating a new process with the details selected
Cancel New Process	Option to cancel the new process and return to the “Overview” dashboard

2.6 Process Detail

Functionality	Description
Check Process Information	Allows to see the detailed information regarding a process, with its type, the companies involved and a table with trigger, action, flow and status of each step
Go Back	The back button permits to go to the “Overview” or “Logs” page, accordingly with the inward path

2.7 New Process Type

Functionality	Description
Add Process Type Step	Allows to add a new step to the process, with all the specifications required, namely the trigger, trigger company, action and action company
List Process Type Steps	Table with a list of all the steps added to the process type that shows all of its specifications and flow
Add New Process Type	The confirm button permits to create a new type of process with all the added steps
Cancel New Process Type	Option to cancel the new process type and return to the “New Process” page

3. Information Architecture

3.1 Overview

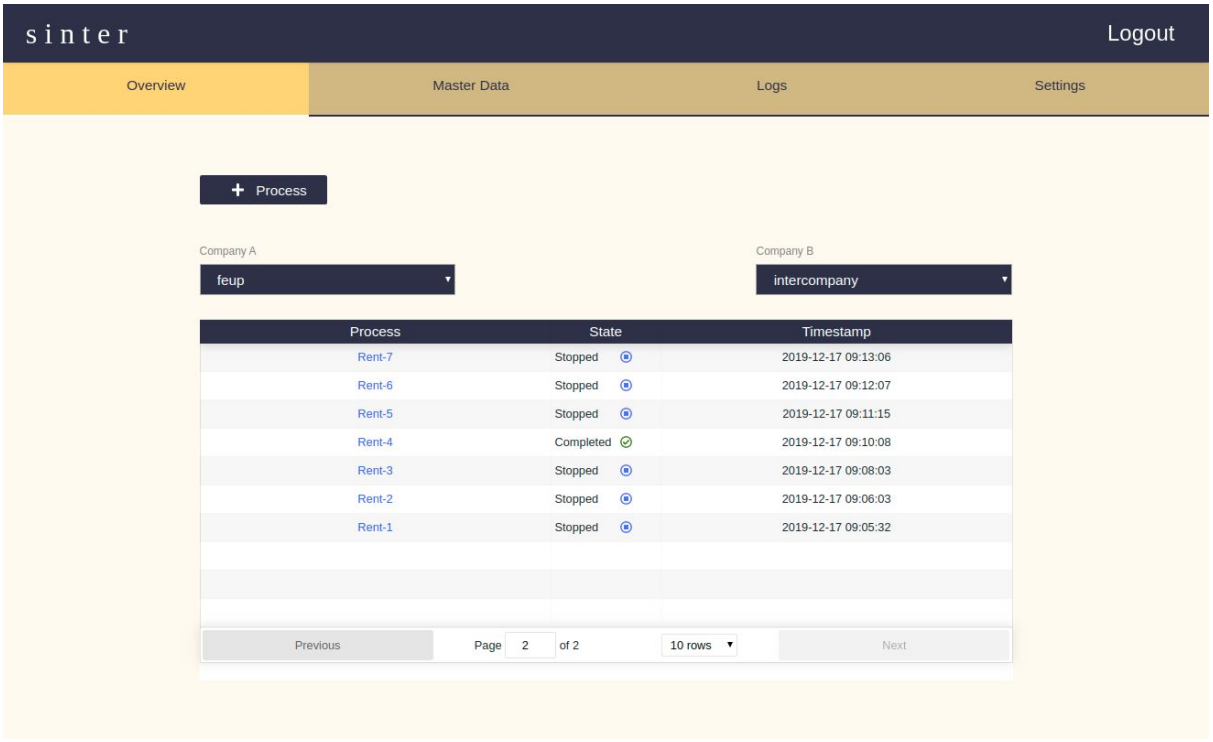

Image 2: Overview screen

3.1.1 Inward paths

- Sign in
- Top bar navigation
- Cancel button from "*New Process*"

3.1.2 Outward paths

- Top bar navigation
- "*+ Process*" button goes to "*New Process*" to create a new process
- "*Process column*" links to "*Process Details*" of that process

3.1.3 User and business goals

- Easily check the status of the most recent processes between two companies of the same group

3.1.4 Elements of the core

- "*+ Process*" button

- “*Company A*” and “*Company B*” selectors
- “*Processes*” table

3.2 Master Data

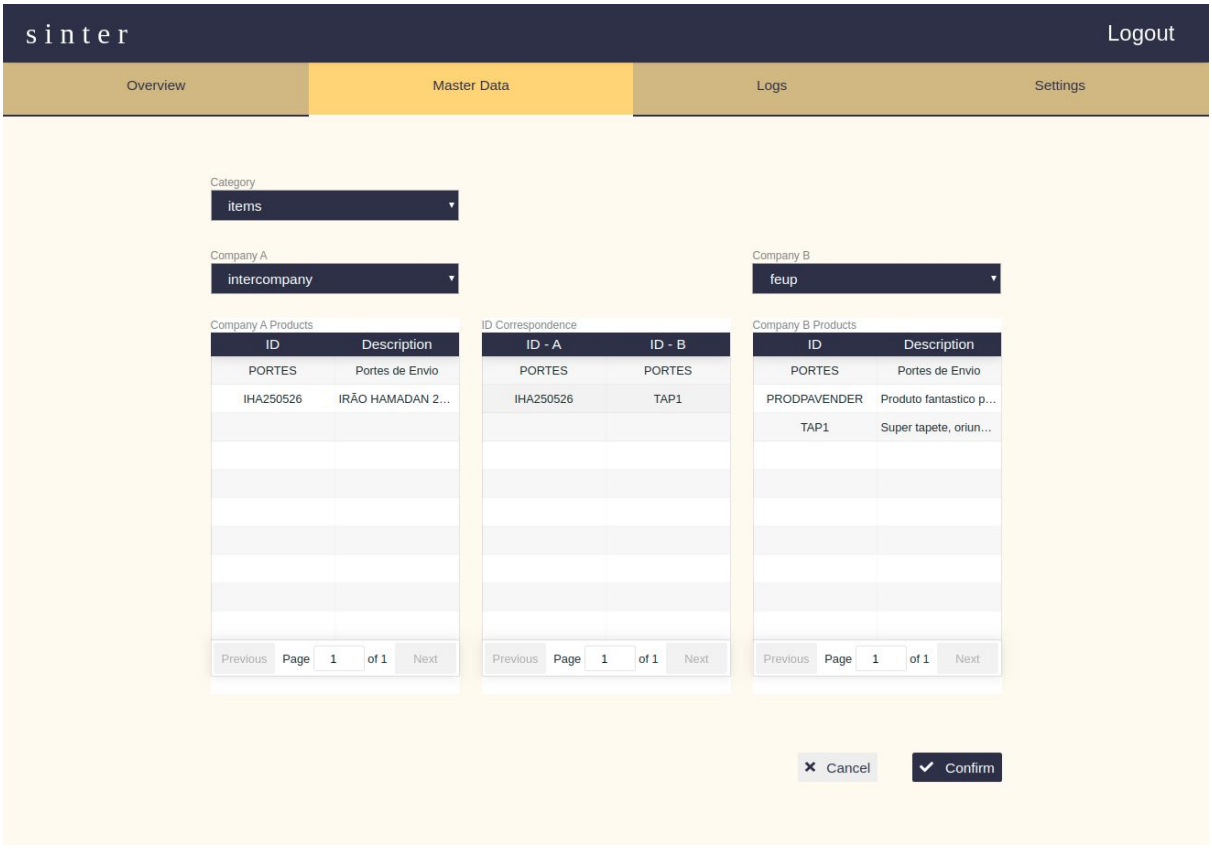

Image 3: Master Data screen

3.2.1 Inward paths

- Top bar navigation

3.2.2 Outward paths

- Top bar navigation

3.2.3 User and business goals

- Easily check the correspondence between all the common items present in the two companies
- Easily add and remove correspondences between items present in the two companies
- Easily check the correspondence between the entities the two companies
- Easily add and remove correspondences between the entities of the two selected companies

3.2.4 Elements of the core

- "*Category*" selector (includes items and entities)
- "*Company A*" and "*Company B*" selectors
- Table with the select category IDs and descriptions from "*Company A*"
- Table with the selected category IDs and descriptions from "*Company B*"
- Table with the ID correspondence between the two companies, regarding the selected category

3.3 Logs

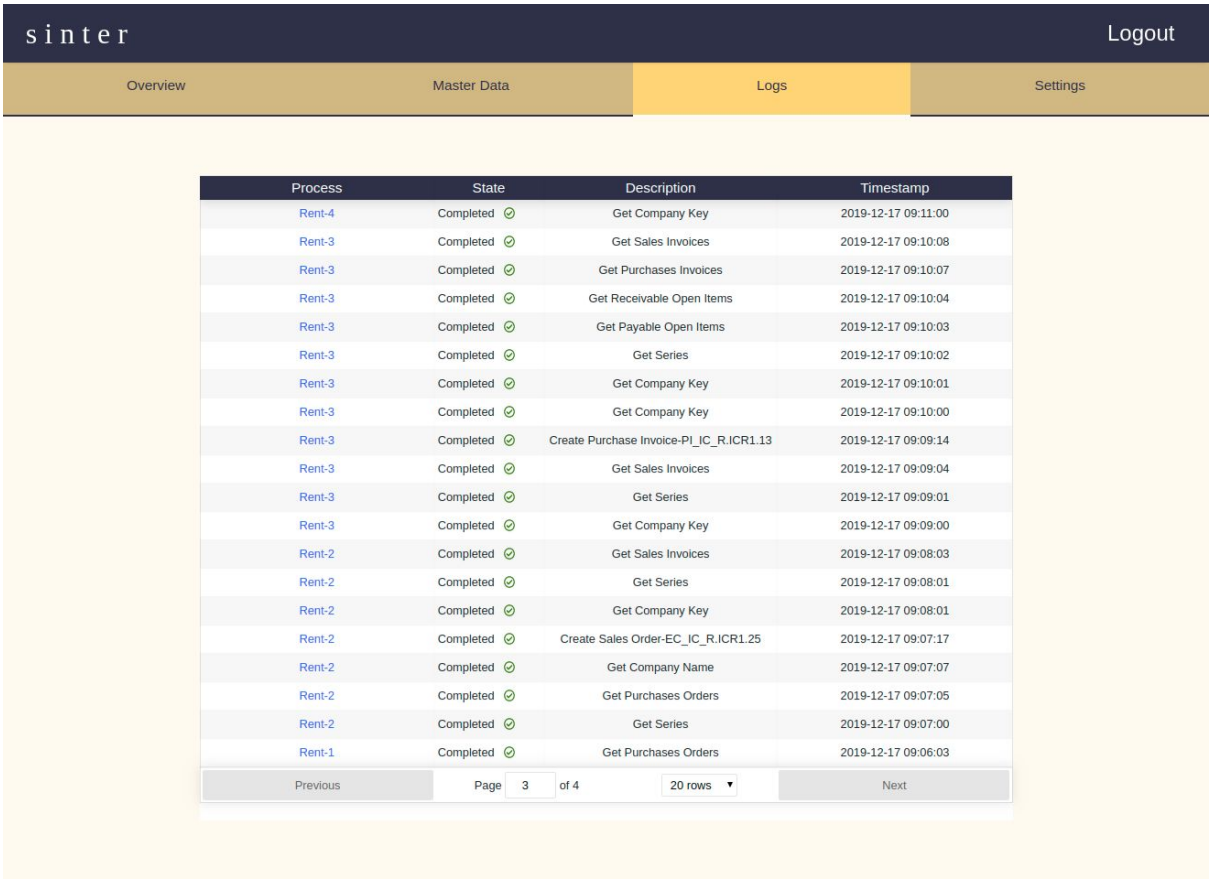

Image 4: Logs screen

3.3.1 Inward paths

- Top bar navigation

3.3.2 Outward paths

- Top bar navigation
- "*Process column*" links to "*Process Details*" of that process

3.3.3 User and business goals

- Easily check the status of the most recent processes between two companies of the same group
- Easily check the status of all the requests made to *Jasmin* in order to complete the processes.

3.3.4 Elements of the core

- "*Processes*"/requests table

3.4 Settings

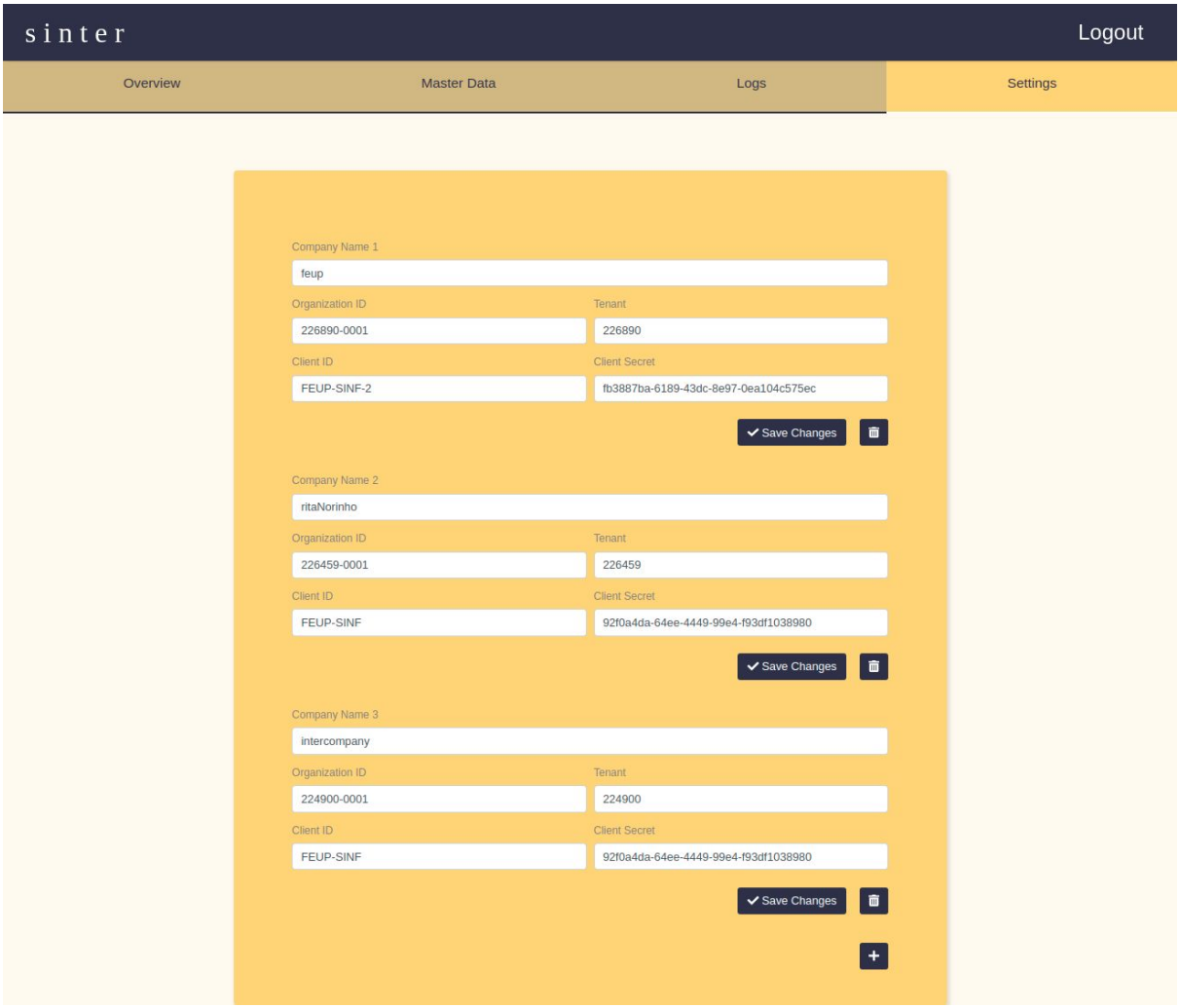

Image 5: Settings screen

3.4.1 Inward paths

- Top bar navigation

3.4.2 Outward paths

- Top bar navigation“

3.4.3 User and business goals

- Easily change the companies’ organization ID
- Easily change the companies’ tenant code
- Easily change the companies’ client ID
- Easily change the companies’ client secret
- Easily edit, add or delete new organizations, of the same group, to the app

3.4.4 Elements of the core

- "*Save Changes"* button, for each organization
- "*Delete*" button, for each organization
- Text inputs, for each field of organization

3.5 New Process

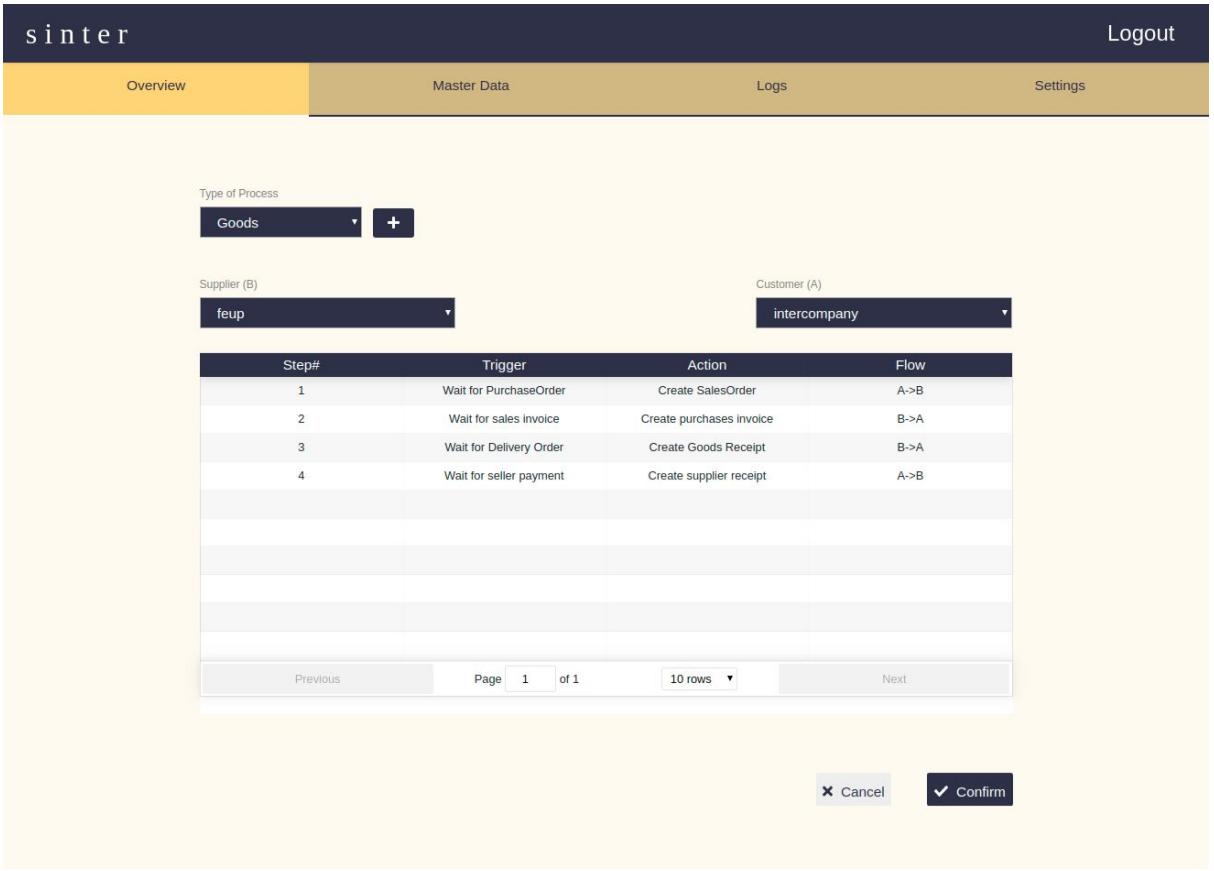

Image 6: New Process screen

3.5.1 Inward path

- "+ *Process*" button from "*Overview*"
- "*Confirm"* button from "New Process Type"
- "*Cancel"* button from "New Process Type"

3.5.2 Outward paths

- Top bar navigation
- "+" button goes to "*New Process Type*" to create a new process type
- "*Cancel*" button goes to "*Overview"*
- "*Confirm*" button goes to "*Overview"*

3.5.3 User and business goals

- Easily create any type of process between two selected companies

3.5.4 Elements of the core

- "*Type of Process*" selector

- “+” button
- Selectors for the two companies involved in the process
- Table with the steps of the selected process type
- “*Cancel*” button
- “*Confirm*” button

3.6 Process Detail

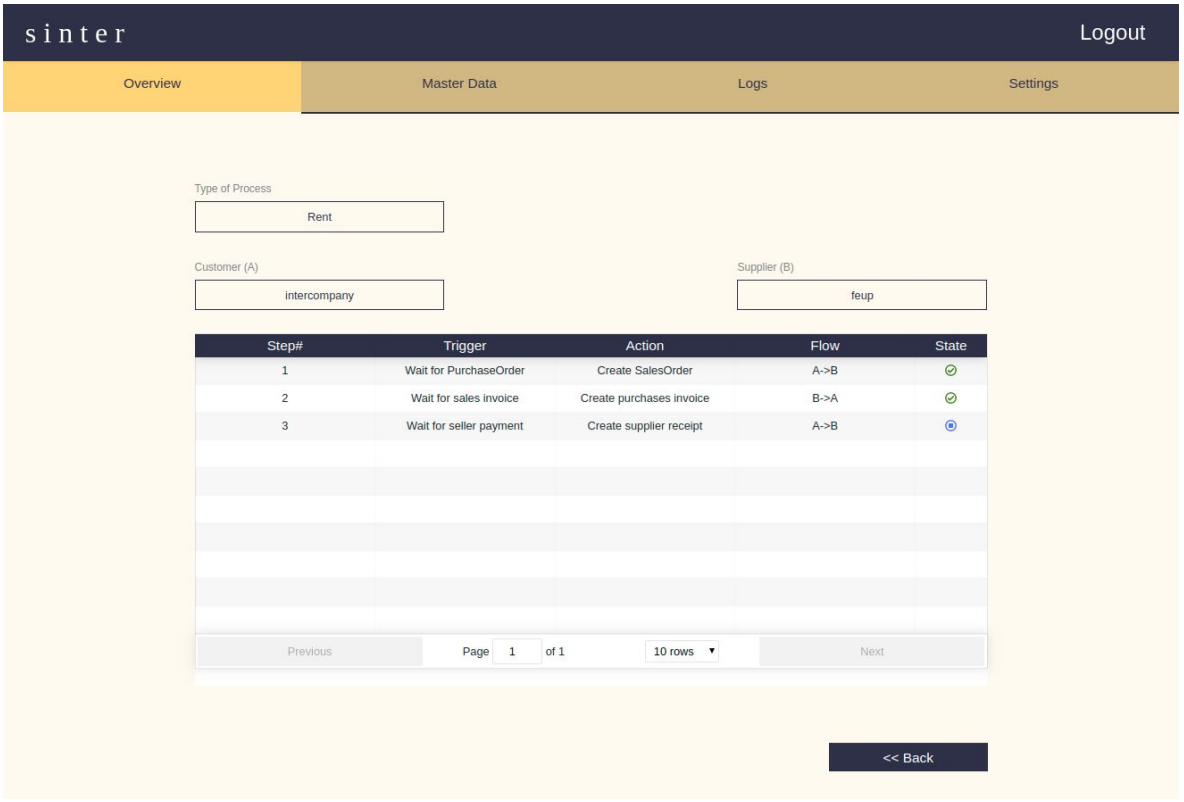

Image 7: Process Details screen

3.6.1 Inward paths

- "*Process column*" from "*Overview*"
- "*Process column*" from "*Logs*"

3.6.2 Outward paths

- Top bar navigation
- "*Back*" button goes to "*Overview*"

3.6.3 User and business goals

- View in a user-friendly way the details of a process, namely its type, companies involved and current state of its steps.

3.6.4 Elements of the core

- "Type of Process" identification
- Identifications of both the companies involved in the process
- Table with the steps required to complete the process and their corresponding current states

3.7 New Process Type

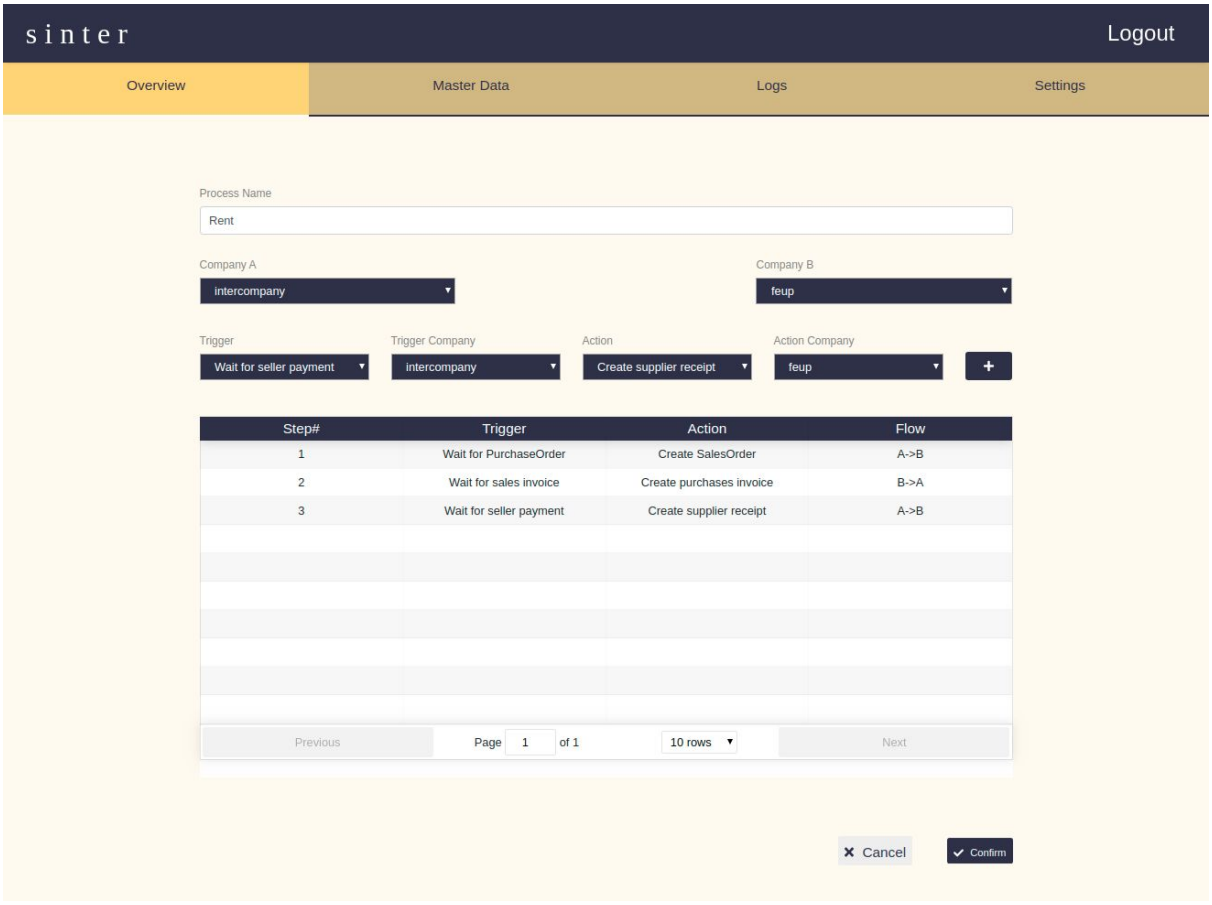

Image 8: New Process Type screen

3.7.1 Inward paths

- "+" button from "*New Process*"

3.7.2 Outward paths

- Top bar navigation
- "*Cancel"* button redirects to "*New Process"*
- "*Confirm"* button redirects to "*New Process"*

3.7.3 User and business goals

- Easily create a new type of process with all the required steps and specifications to complete it

3.7.4 Elements of the core

- "*Process Name"* input
- "*Company A"* selector

- “*Company B”* selector
- “*Trigger”* selector
- “*Trigger Company”* selector
- “*Action”* selector
- “*Action Company”* selector
- “+” button to create a new step
- Table with all the steps created or generated for the process
- “*Cancel*” button
- “*Confirm*” button

4. BPMN Flows

The implemented interface allows the creation of different types of processes providing a more customizable experience for the user and the generation of different scenarios and relations between different companies, of the same group.

In order to demonstrate the flow between two companies, of the same group, two examples of these scenarios were represented via BPMN.

The first represents the process of renting a machine (or multiple machines). In this scenario, a company of the group owns the machines that other company of the group uses, to manufacture its products. Without the provided solution, someone from both companies, or someone working for both companies, had to engage in several monotonous steps, where numerous documents had to be created, taking too much time and effort. Using the developed interface, this process can be simplified, automating the creation of some of the documents, e.g., when a *Purchase Order* is created, a corresponding *Sales Order* is created. This scenario begins with the creation of a *Purchase Order* and ends with the reception of the receipt, going from the beginning through the end of the complete rent scenario.

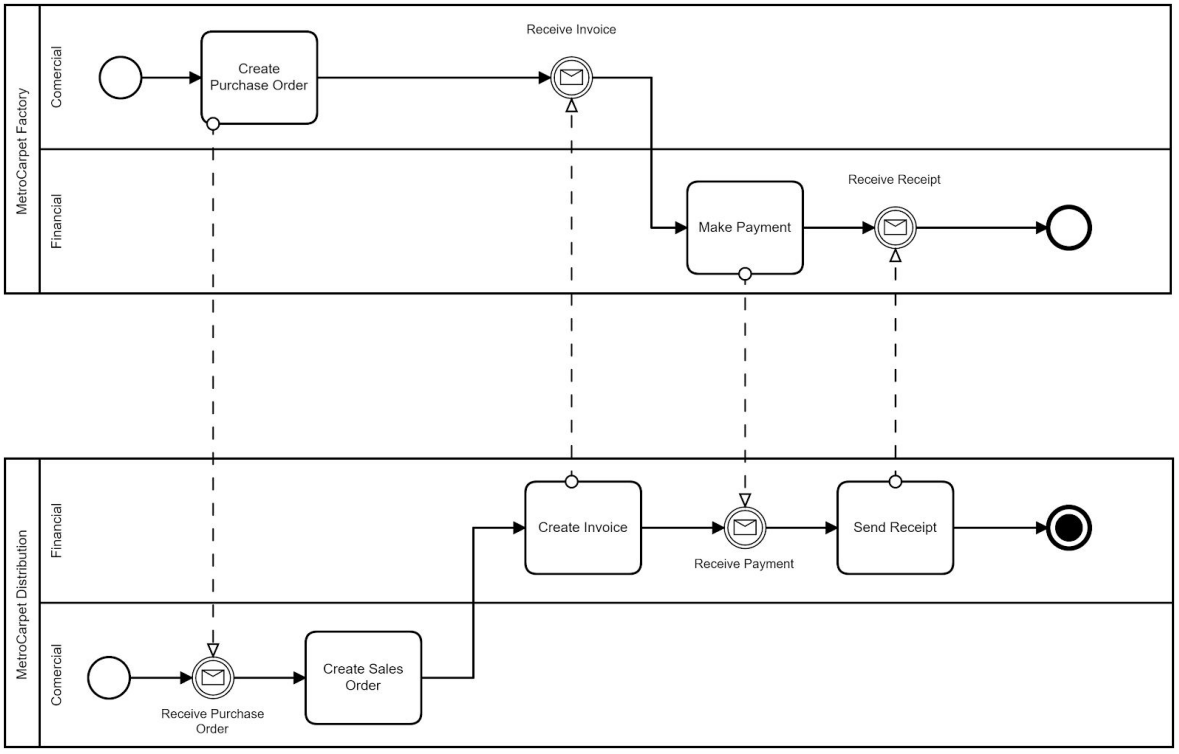

Image 9: Renting Machines BPMN

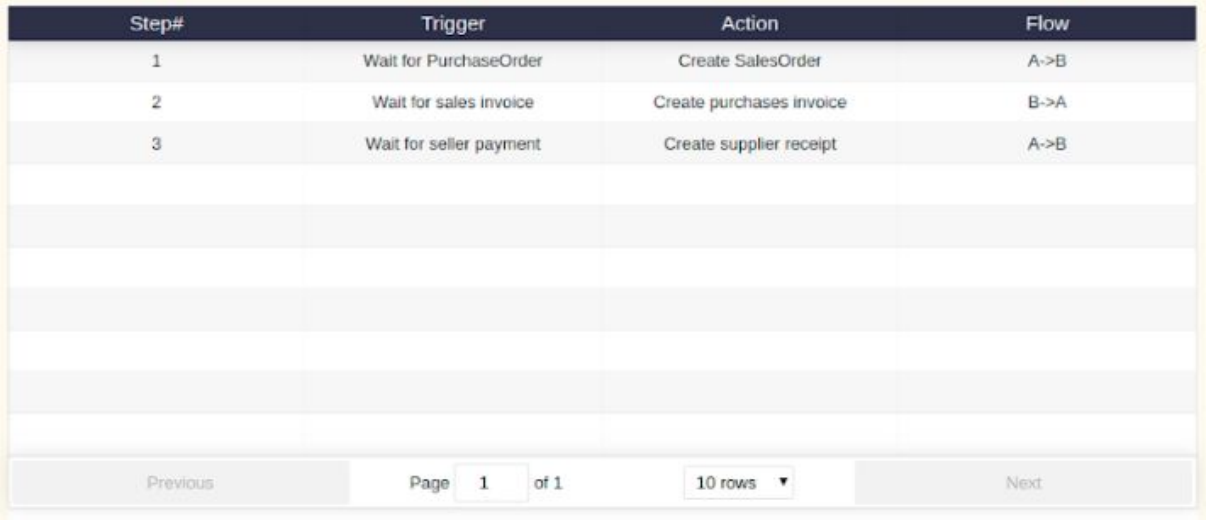

Image 10: *Rent* Process Type

This process is represented by the Process Type "*Rent*" in the implemented *WebApp*, which does three different steps:

- Replicates Purchase Order to Sales Order;
- Replicates Sales Invoice to Purchases Invoice;
- Creates a Supplier Receipt based on the Customer Payment.

On the other hand, the second scenario represents the process of purchasing products, such as rugs and carpets. In this scenario, a company of the group owns and manufactures the products that other company of the group distributes. This situation presents the same problem as the previous one, most steps had to be manually created by one or more employees of the companies, which considering that the companies belong to the same group is very inefficient and time consuming. The developed interface represents a solution to this problem by automating and simplifying some of the required steps. This scenario also begins with the creation of a *Purchase Order* and ends with the reception of the receipt, representing the complete flow of the purchase process.

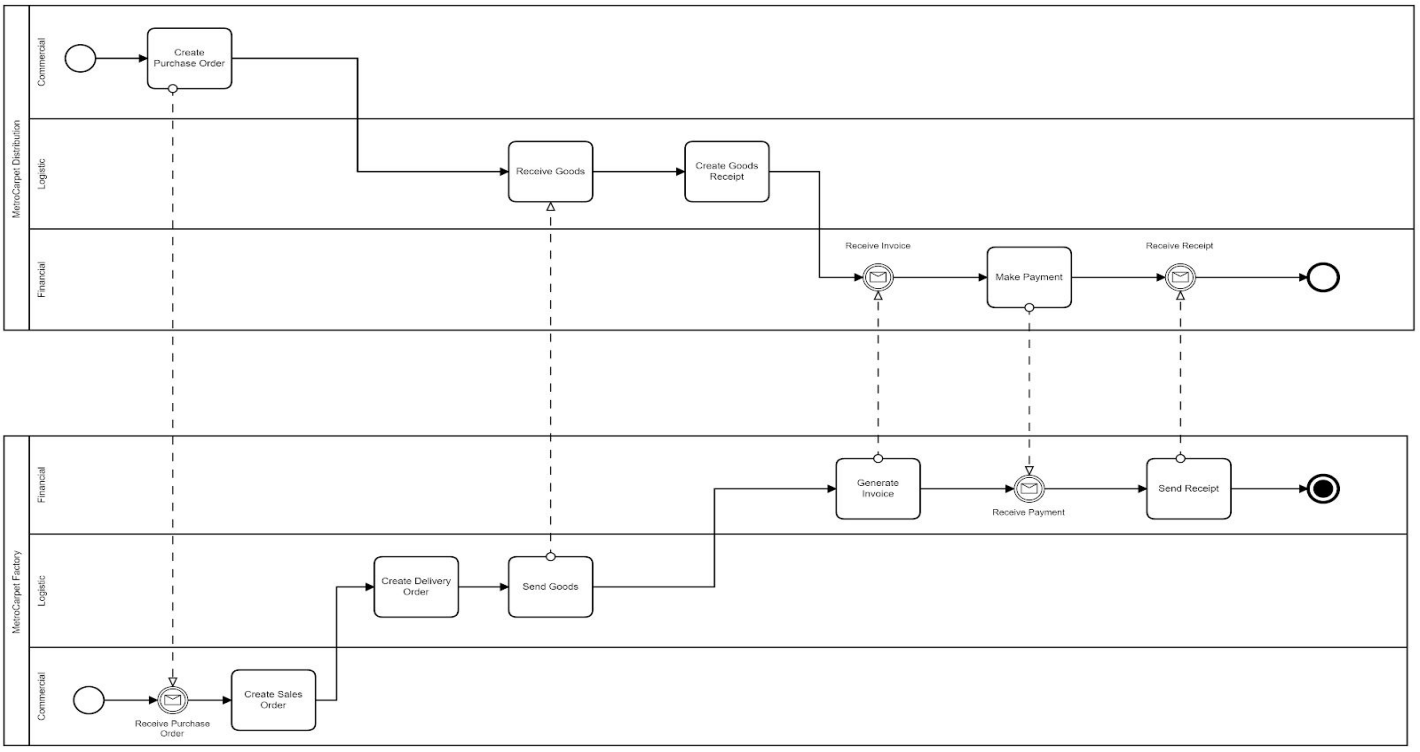

Image 11: Purchasing Products BPMN

Step#	Trigger	Action	Flow
1	Wait for PurchaseOrder	Create SalesOrder	A->B
2	Wait for sales invoice	Create purchases invoice	B->A
3	Wait for Delivery Order	Create Goods Receipt	B->A
4	Wait for seller payment	Create supplier receipt	A->B

Previous Page 1 of 1 10 rows Next

Image 12: *Goods* Process Type

This process is represented by the Process Type "*Goods*" in the implemented *WebApp*, which does four different steps:

- Replicates Purchase Order to Sales Order;

- Replicates Sales Invoice to Purchases Invoice;
- Replicates Delivery Order to Goods Receipt;
- Creates a Supplier Receipt based on the Customer Payment.

Note: The BPMNs full images are also present on the zip folder sent.

5. Planning

In order to achieve a good time management strategy approaching this project, the team elaborated a Gantt diagram. By organizing, dividing and defining a start and end moment for all the tasks, the team could work efficiently on said tasks, ensuring constant progress and providing an overall good management tool to track the work required to complete the project.

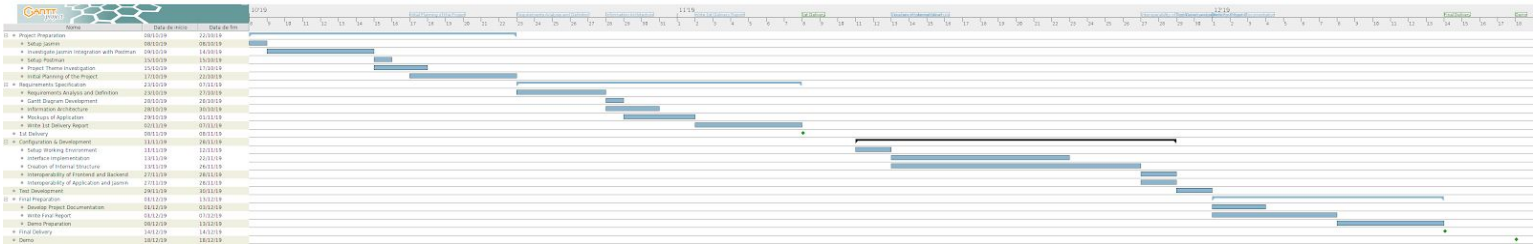

Image 11: Gantt chart

Note: The Gantt chart full image is also present on the zip folder sent.

6. Jasmin Setup

The correct execution of the developed application is based on the setup of a different series for each of the various process types created. By doing this, the problem of more than one process having coincident steps is resolved. For example, the rent process and the goods process only differentiate on one step (regarding the goods deliveries and receipts), if different series were not created for each process type, the application would not be able to distinguish between the two processes if two instances were running at the same time.

This means that every time a new process type is created a new corresponding series must be created as well. The correspondence between series and process type makes use of the first letter of the process type name (meaning if the user does not want two processes running on the same series the names should start with different letters).

Necessary documents for each process type (associated with the correct created series):

- Series for process type in both companies;
    - IC + first letter of the process type + 1 (ex ICG1)
- Purchases orders types that match the series in customer;
    - ECF_IC_ + first letter of the process type (ex ECF_IC_G)
- Sales orders types that match the supplier side series;
    - EC_IC_ + first letter of the process type (ex EC_IC_G)
- Payment Invoices in customer;
    - PI_IC_ + first letter of the process type (ex PI_IC_G)
- Sales Invoices at Supplier;
    - SIIC + first letter of the process type (ex SIICG)
- Goods receipt type on customer
    - GR_IC_ + first letter of the process type (ex GR_IC_G)
- Delivery type on supplier;
    - DOIC + first letter of the process type (ex DOICG)
- Payment type on customer:
    - PAG_IC_ + first letter of the process type (ex PAG_IC_G)
- Receipt types on supplier;
    - REC_IC_ + first letter of the process type (ex REC_IC_G)

7. Final Considerations

Through the development of an Intercompany *Module*, integrated with Primavera's Jasmin Platform, the group acquired several critical skills, in many different areas, such as *Background Jobs* (using Bull Queue Package Manager), *API Integration* (applied to Jasmin) and a better understanding of the *Sales/Purchases* flow and all the documents associated with it.

The Intercompany concept, which many *ERP's*, like SAP, offer, was not present at all in Primavera, forcing users to duplicate manually all the documents necessary. This was an inefficient time-consuming process, susceptible to human errors. With this solution, this process was cut in half, effectively reducing the time needed to do this kind of operation, providing value to the company.

The goal of this project was to create an intuitive, user-friendly and appealing interface, that provided users with the power to create new intercompany processes, using predefined types of processes, or dynamically and interactively creating new types of processes, customized to the needs and requirements of the market where it is inserted, and its position in it.