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Redesign and Implementation of Business Processes in the Insurance Domain

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Abstract

This thesis presents the analysis and implementation of the activities carried out during the support given to the Claims Management department of the Italian company RGI Group, for the development of a migration plan, for eight of the BPM processes of a particular product called Pass_Claims. It is included also, the analysis of the tools that the company has decided to use, and the actual implementation of each on the processes over the Camunda BPM solution, by making use of the Business Process Model Notation 2.0, Camunda BPM tools and Java programming language.

The Pass_claims system offers a solution for *Claim Management*, to the clients of an Italian software company dedicated to the development of solutions for insurance organizations. RGI Group has been growing in the last years to become an European leader on the field; the management of its processes has been carried out in the same way for many years, through which new technologies have emerged. Now, it is time to look forward, analyze those technologies and take advantage of them, to be able to highlight in the competitive field of insurances. This has brought to the position of implementing the Camunda BPM solution for the management of its business processes, over the JBPM engine that the company had been using.

The recognizing of concepts took place, for the objective understanding of the theory behind the analysis and, in this way there was included the *workflow* (automation of business process) and therefore, the workflow management systems were studied, the Business *Process Management Notation 2.0* for the actual definition of each of the processes, as well as the basic concepts of the engines which the company had been using and which it wants to incorporate, these are the *JBPM* and the *Camunda BPM*, including their components and main characteristics of the way each of them was incorporated inside the company for the management of its workflow processes. An investigation on Business Process Management and relevant concepts related takes place, to make sure that the analysis of the processes has been seen from both the business and technical points of view. Each of the processes is analyzed, to make sure that they still have the design and configuration which is expected by the company, the clients and Italian regulations.

The claim is seen as one of the most important units within the insurance domain, this is why companies put together their efforts to manage it in the best possible way. If a claim is handled well, retention rates may rise, instead if handled poorly, the insurer may not only lose the customer, but also damage its wider reputation. This is why insurance companies invest on it big amounts of money, up to the point in which commercially, claims are considered by far the highest single cost in the field. To acquire the benefits of greater control, RGI Group has given to the claims department a new meaning and has re-thought its role within the company, seeing it as an important key that can bring real value to the business. For these reasons the management of the workflow is performed by the claim management department, all the processes are handled by it, including the eight processes considered for this dissertation, which are located inside the

Core and Support processes within the company. These processes are the following:

- Administrative Cover Check
- Notify Take In Charge
- Payment Deadline
- Position Communication
- Verify Claim Anti-Fraud
- Manual Deadline
- Possibility Recovery Insured
- Report Potential Claim
- Discordant Responsibility Deadline

The first step on the migration analysis is to evaluate the *as-is situation*, this means that it is necessary to find the characteristics that made of JBPM, the selected engine when the company designed the processes for the first time, and to find the negative aspects to make sure that the new tool that has been chosen, covers them and provides a solution to each of them. Moreover, for each one of the process definitions, it has been carried out an analysis, making sure that requirements are covered and handled as expected. During this part of the analysis, the results found that the major problems in the design are related to deadlines management, priority management, the aspect of the graphical representation, data allocation and multi-language availability.

Similarly, the Camunda BPM solution is analyzed, having into account the aspects that were to change after the previous analysis. The design is made and the diagrams are pictured using the BPMN 2.0 notation within the Camunda Modeler, for each of the processes. Also, modifying and creating the necessary java classes to link the diagrams with the already-existing logic of the system and to allow the correct behaviour of the processes. This is, to create what is presented as the *to-be situation*. It is also illustrated, the new organization of the system, in which the actual logic of the Pass_claims system is located in a different application server than the logic for the management of the workflow. Apart of defining and putting into functioning the Camunda BPM solution, for the previously listed processes, it was necessary to define two additional processes, these are:

- Alert User In Charge
- Alert Manager

Finally, there are presented the improvements achieved by the implemented solution, the redefined workflow management corresponds to an organized and conscious arrangement, which goes according with the company's growth and expectations. Having separate application servers, for the logic of the system and for the bpm, represents advance in the way that it provides organization and segmentation within the activities inside the claims department. At the end, the solution did not required a *complete* reorganization of the company's processes and the redesign involved just the addition or modification of java classes, xml and bpmn files; also

because Camunda BPM considers as main idea, the easy implementation and understanding of workflow processes by all the components of an organization. The renewed design of each of the processes gives a sensation of being modern and updated. Priority and time management suffered important changes, however always having into account the retro-compatibility of the system. The necessity of finishing activities when the restarting of timers or the re-calculation of priorities, are no longer necessary given that they were replaced by means of the implementation of the feature of non-interrupting events within tasks. Delegation principles were inserted for the implementation of events, timers and gateways. And, the multi language feature on the BPM of the Pass_claims system was incorporated, to support the wider opening of the markets of the company, abroad.

As a conclusion, it can be highlighted the role of Camunda as a important aspect of improvement for the company, because it defines standards in addition to provide a modern and better organized design of business processes. The advantages on the solution responded to the complications found with the previous implementation, which involved the JBPM engine. A standard on the design was made, in this way, the graphic organization of the processes gained a meaningful importance within the company, there is to highlight the idea that the company can trust in Camunda for the future technological updates regarding the workflow, this is because this solution is seen as a separate component and it is managed by Camunda org, in contrast with the JBPM solution, in which updates had to be carried out by the development team of the company. The presented document contributes to the understanding of implementation of new technologies. The redefined processes are currently being deployed for one of the most important clients that the company has, and this change is expected to provide great profits in general.

Dedication and acknowledgements

This thesis and my academic achievements are dedicated to God and to my beloved family, specially my parents Gloria and Carlos, whose endless love, faith and encouragement have walked me through this process. I couldn't thank you enough.

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Chapter 1

Introduction

This chapter is intended to give a high level overview and a general introduction (1.1) to the implementation of software engineering and information systems concepts in a real company: RGI Group, located in Italy. With the purpose of helping it to be updated on the technological progress and evolution that has taken place over the past years, specifically in new technologies created for the management and implementation of processes. All of these, to bring up the description of the problematics (1.2) that leaded the production and development of this document. Moreover, there are shown the scope and limitations of this process (1.5) as well as the objectives of the same (1.3); at last, the hardware and software technologies exploited (1.6).

1.1 General Introduction

Change is the word that characterizes what technology is nowadays and moreover if we talk about technologies related with the field of information. The constant acceleration on the activities that we perform every day, the stress in which we live, the decision taking in short periods of time, are just activities that have highlighted the importance of migrating and evolving not to remain behind.

The world of information processing has been changing in a big proportion and this is worth emphasizing because it helps somehow each and every person to develop efficiently and effectively their activities at work, business, industry, government and even in their personal life. Companies have maintained a competitive edge by improving and optimizing their business processes without compromising efficiency, quality, and response time. During all these years, wonderful ideas have been growing and this is also the case of BPM (Business Process Management), a business initiative, which by using software tools, introduces order in respect of due process procedures and allows the reporting of the business processes of a company in real time. Since the Industrial Revolution, process management techniques have continuously evolved; from process definition and workflow management, to process improvement and reengineering to today's business process management (BPM). While other industries have adopted BPM for their core processes, the

insurance industry has been reluctant to implement BPM in its core areas like underwriting and claims. Lately however, insurers have come to appreciate the advantages and successes of BPM, and are implementing it at a growing rate [5].

This is the case of the successful Italian company: RGI Group, which for thirty years has been growing up to be now a European leader [10] in the digital transformation of insurance companies by developing several products that aim to the specific and correct management of information for its clients, providing them with tools that help them evolve and be recognized.

This document presents the importance of BPM technologies and specifically the relevance that it acquires when we speak about the Insurance domain, giving detail to the case of the software developer company RGI Group, by implementing the Camunda BPM solution on its workflow processes.

In the second chapter there is shown all the concepts and fundamentals which are necessary to understand and follow properly this process.

The third chapter shows the company, giving an overview of what it does and its place in the insurance domain and getting into detail with its products and more specifically with the *PASS-Claims* product that includes all the processes mentioned in this document.

All the following chapters describe the implementation of the BPM in the RGI company's workflow processes over Camunda BPM tool; going through a comparison of Camunda with the previously used tool JBPM, the reasons why the company took the decision of migrating and also some conclusions of this process.

1.2 Problem Definition

The Italian company RGI S.P.A. is an Independent Software Vendor for the digital transformation of insurance companies. [10] right now is looking for changes in the way of keeping itself updated with all technological breakthroughs and more important to retain its position in the competitive field of insurance business. Specifically, the department of Claims Handling, is implementing new technologies for the optimization of the workflow processes, looking for rapidly delivering customized services and ensuring control over the entire claims handling process. However, streamlining a claim workflow can be challenging due to the number of employees working on a single claim and the complexity of handling with it.

A company can outline processes repeatedly, and the chaos makes them hard to follow. In addition, the exact path of the insurance workflow process depends on certain factors, which need to be documented properly. For instance, whether the current insurance certificate is on file with the vendor will determine what will be the next step in the process. Every employee in the workflow path must know what to do next, but there are times when *what to do* isn't defined clearly and that can affect speed. Other challenges include claims that mistakenly were not submitted, claims taking too long to be processed, managing claim values, and claim

communications, these are issues that tend to plague all insurance company processes.

For these reasons it is essential to manage claims in a proper way and so, companies are in constant search of changes to keep the rhythm, as is the case of RGI who has found in BPM a useful tool to accomplish it.

1.3 General Objective

Apply the knowledge acquired of Computer Engineering and moreover on Information Systems to support the Claims Management Department of the company RGI Group on the reengineering of their workflow processes by making use of BPMN 2.0 (Business Process Model Notation), Camunda BPM tools and Java programming language, allowing the migration from JBPM to Camunda BPM 2.0 on the different environments that the department works on and, specifically for the product *PASS-Claims-RGI*, this will be achieved by redesigning and implementing the processes for both Evolutive and Integration environments.

1.4 Specific Objectives

- Conversion from JBPM to Camunda BPM 2.0 of the following processes of *PASS-CLAIMS-RGI* product: (4.5)
  - Administrative Cover Check
  - Notify Take In Charge
  - Manual Deadline
  - Payment Deadline
  - Verify Claim Anti-Fraud
  - Possibility Recovery Insured
  - Reception Claim Inexistent Policy
  - Discordant Responsibility Deadline
  - Report Potential Claim
- Technical **analysis** and **process review** to introduce BPMN 2.0 features
- Production and Integration of Technical Guidance for the conversion and/or creation of a BPMN 2.0 process on Camunda BPM

1.5 Scope and Limitations

During this section, it is illustrated the scope of the process (1.5.1) of transformation of the workflow processes to support the company RGI Group on the migration from JBPM to Camunda BPM, having into account also the limitations that it has (1.5.2).

1.5.1 Scope

It is evident that the role that BPM plays in the insurance business has become vital, as it is a very competitive field it is necessary to keep improving technologies and trends, specially when we talk about handling the client claims and, this is a very important aspect to highlight because it represents a big amount of money in looses if it is not well managed.

For these reasons RGI Group has seeing in Camunda BPM an innovative solution and so it has created a whole migration plan to replace in an evolutionary way each an every business process. The part of the migration treated in this document, encompasses the conversion from JBPM to Camunda BPM for the Italian company RGI Group and specifically in the department of Claim Management, located in the city of Turin by supporting the optimization of their workflow processes.

1.5.2 Limitations

The conversion, analysis and implementation of the workflow processes, for the optimization plan of the company RGI Group that this document encompasses, is in one of their product, specifically in the *PASS-CLAIMS-RGI* product and at this stage it has been implemented just for the processes of: Administrative Cover Check, Notify Take In Charge, Manual Deadline, Payment Deadline, Verify Claim Anti-Fraud, Possibility Recovery Insured, Reception Claim Inexistent Policy, Discordant Responsibility Deadline, Report Potential Claim.

1.6 Hardware and Software

During the redesign and implementation of the project, it has been necessary to draw on some specific hardware and software,which are listed in the following section.

- Programming languages Java, XML and BPMN
- Database administration MySQL
- Camunda BPM Modeler
- RGI Autore

Chapter 2

Theoretical Framework

What it is intended to be done in this dissertation, is to support the reengineering activities of RGI Company, which are in charge of the Claims Management Department, by making use of some engineering concepts and more in detail of BPM so that the information systems used by the company can be leveraged optimally and represent monetary benefits. To do this, it is necessary to put into context all the fundamentals and link them altogether.

All along this chapter there will be presented the concepts that have taken place during this process. First of all it is important to highlight the fundamentals of this implementation and so to bring into the table the concept of *Information Systems* (2.1) which is the base of this dissertation and also the base of the rest of the concepts here described. Further on, the concept of Workflow (2.2), having into account the insurance domain. Then, the theory of reengineering and the workflow reengineering (2.3) to be able to analyze what could be reused or what is necessary to implement for the processes and to be able to properly generate an improvement. Moreover, an overview on the concept of BPM (2.4.2) that will be looked at in depth at a later stage in the present document, this is in the chapter BPM: Business Process Management (3), as well as Business Process Modeling (2.4.3) and the Business Process Model Notation: BPMN (2.4.4). Finishing with a brief introduction to JBPM (5.1) and Camunda BPM (2.4.6) that will be also analyzed in deep within the chapters (5) and (6), respectively.

2.1 IS: Information Systems

The way of handling with information is the key for an organization to succeed, information systems not only make processing easier but they give value to any kind of company. The concept is defined in accordance with:

"Information Systems are interrelated components working together to collect, process, store, and disseminate information to support decision making, coordination, control, analysis, and visualization in an organization. ...In fact, we might say that one of the roles of information systems is to take data and turn it into information, and then transform that into organizational knowledge." [7].

When mentioning Information Systems, in the context of this section, it refers strictly to **Automated Information Systems: AIS**, these are the ones involving *hardware*, *software* and technology in general, with the aim of collecting, organizing, storing and communicating the information within an organization. These systems enable the possibility of improving the organizational management and the decision taking, by performing operations in a faster and more accurate method than the traditional, as well as helping in the analysis of markets and competitors, enabling statistics and in general, providing relevant information.

Before implementing Information Systems inside the organizations, processes and procedures used to work in a sequential and much more simple way than they do nowadays, that is to say that, with a paper-based approach the documents were used as *"Tokens"* within the processes because they could physically be just in one place at a time and this ensured that the activities on any document would be carried out and performed by just one person at a time too. But now, the context is far from that and different workers can perform operations over the same piece of data, information is shared easily and work is done concurrently.

In order to properly take advantage of the benefits of implementing information technology within a company, the information systems must follow a determined structure in a way that it can evolve and suffer future changes without representing a possible weakness for the business process. Changing also means to keep a process-oriented approach. This structure considers the following characteristics: [26]

- Information systems must clearly reflect the structure of the business process, in such a way that it makes the process recognizable to the user and reduces the chances of errors occurring, both during the development of the system and during the performance of the process.

- There should be integrated systems, this means that they should have the possibility of being mixed with non computerized tasks.

- Information systems must be set up in such a way that the structure of the business processes can easily be modified. This enables organizations to respond flexibly to their changing environment and to restructure their business processes accordingly.

- They should allow the possibility of properly tracing problems when they occur, so they can be discovered at an early stage. The performance of the business process should be easy to measure, and possible to improve.

- The allocation of work to people is a point of particular interest. Good workload management is crucial to achieving effective and efficient business processes.

The organization of work, inside a company and between competitors, is becoming more and more complex. This is the reason why the information systems are considered relevant, they can also support the management of processes and their coordination. The Workflow (2.2), that is the automation and a conceptual model of a business process, is an excellent way to meet this need. Moreover, time on completion of task has been highly reduced and error are less likely to happen.

Workflow Information Systems are the application of information technology to business problems. Allowing the automation of processes by involving the combination of human activities and information technology applications. Before, the golden rule was: "First organize, then computerize" [26].

Companies used to implement business processes and assumed that they would have been managed mainly by people. Then, just after that, we would decide whether technology could partially support any part of the process. But, now it results obvious that this idea does not take sufficiently advantage of the the opportunities of technology. Nowadays, the main approach considers information systems as an essential and necessary part of the process. First, the process is design in an abstract way without going into details of the implementation, then designing the information systems and deciding weather each task inside the process should be performed manually by a person or automatically by an information system.

When developing information systems to be implemented by business processes, it is necessary to place a strong emphasis on defining the data structures and the way in which the application will be presented to the users, in other words: the user interface. It is to highlight that any change on the workflow processes will produce a reaction in the relationship between users and the organization, implementing information technology will make people interact differently and so it is necessary to do it in the more accurate possible way so these reactions can be positive and the change wont have a negative effect for the company.

The categories of the Information Systems are listed below, they are organized concerning the functionality of the system, in the way that the first one considers few knowledge of the process and is used just to support the manual activity of a person who has complete knowledge of the process. On the other hand, in the last one the process is managed entirely by the system and just considers few manual interventions. [26]:

1. **Office information systems:** people take control of the management activities within the process, by making use of IS just for the development of some operations to perform basic information processing such as: calculating (spreadsheets), writing (word processors), filling (simple database management systems) or communicating (electronic mail). These systems do not contain any knowledge of the processes. Although the information which they process may contain business knowledge.

2. **Transaction-processing systems:** in charge of communicating relevant aspects of the changes in a process and record these changes. Some of this systems can specialize in communication between the organizations making use of Electronic Data Interchange such as XML. These can be database management systems and workflow management systems (2.2.1) (they have knowledge about the process).

3. **Knowledge-management systems:** take care of the acquisition and distribution of knowledge to be used by people. An example could be a case-based reasoning system that searches through a database of best-practice cases and that finds cases with a high level of similarity to the actual case. Managers are mostly interested in aggregated data about the processing of cases or about the cases themselves. Here it is often used the data warehouses (that store aggregated data in multidimensional cells) which are connected to tools for statistical analysis.

4. **Decision-support systems:** compute decisions through interaction with people. There are two types of decision-support systems: one based upon mathematical models (e.g. budgeting, investment, and production-planning systems), and the other based upon logical reasoning systems also known as expert systems (e.g. a system that establishes the cause of a defect in a machine.)

5. **Control systems:** or programmed decision-making systems. They calculate and implement decisions automatically in totality, based on the recorded state of a process (e.g. automatic ordering, climate-control and invoicing systems).

In theory, the *Control systems* seem to be ideal from the point of view of efficiency, but in reality it is a good practice *to combine the four categories* because it is limited the set of processes in which it is not necessary to have manual interventions at all and also, because the decision making is still expected to be done by people.

2.2 Workflow

In 1996, *the WFMC: Workflow Management Coalition* (an organization whose role includes standardizing workflow management terminology and defining standards for the exchange of data between workflow management systems and applications [26]) published a glossary of all useful terms related to workflow. It defines workflow as: *"The **automation** of a business process, in whole or part, during which documents, information or tasks are passed from one participant to another"[17].*

Over the past two decades, we have seen a revolution in the way science and engineering are conducted. Computation has become an established *"third branch"* of science alongside with theory and experiment [8]. In this way, computational tools have been adopted in applications

that involve complex data analysis steps, all this came along with changes also in the business community, they have been looking for an automation of their business logic and tools, and so forth came what we now recognize as Workflow.

The workflow is a high-level specification of a set of tasks, and the dependencies between them that must be satisfied in order to accomplish a specific goal [8]. It organizes and controls tasks, resources and rules, necessary to complete the business process.

FIGURE 2.1. Benefits of Workflow Management System.
Figure reproduced from [16]

The main idea of Workflow is to look for the maximum automation of processes and control of its different phases during which information, documents or tasks move from one participant to another constantly. So at the end workflow is when information and documents are passed between participants through a flow of work. Trends are making of the workflow a key tool to achieve greater speed and decentralization of administrative and commercial activities within a company.

Workflow management supports processes of an organization by using specific software, so activities can be carried out by participants or computer applications. These software systems can integrate several functions, such as: The use of information technology tools for information sharing and manage communication, and switching tasks from one employee to another, this is therefore known as *Workflow management systems* (2.2.1). Placing IT into the workflow brings with it some advantages, it enables the idea of taking quicker actions and making smarter decisions and, in this way, getting the maximum value and efficiency from all company's resources. The Figure (2.1) illustrates the benefits that it brings to a company, these are:

- **Saving time and cost:**

Implementing workflow reduces the high cost of human labor, minimizes costs of having errors and miss-communication. More accurate data means better decisions and, better decisions always save company money. It brings down operational costs because automated workflows can restrict redundant processes and departments, it is easy to realize how much time the departments spend running around in circles, finding and collecting data that should not take so long in a way, they waste time that could have been spent doing something much more productive, the monitoring capability of workflows allows processes administrators to identify bottlenecks and track waste. All these, combined with report and analytics, can prove to be a powerful tool for companies to avoid unnecessary cost and focus on the important areas.

It is not about just calculating the amount of time saved by using workflows, but the idea is to quantify it in an actual amount of money. As it reduces errors, departments and teams can focus their time on the high-priority tasks. And combining it with better data for better decisions, it is evident that using an automated workflow tool is a clear example of how to save money with a more technological approach of things.

- **Automate information flow processes:**

  Within automation, systems can handle documentation, data entry, notifications, data recall, and handling predefined conditions much better than humans can. In a typical, paper-based manual system, repositories or data stages were feed by means of slow processes that used to take days to be completed and so they made it impossible to scale. When adding the automation, by means of automated forms and workflows it is possible to get more work done every day and this can be translated into more revenue. Manual paper processes used to rely just on human brain-force and capabilities to complete all tasks. Now, all of these are delegated to systems and benefits for companies are considerable.

  "Let systems do the jobs they do best (including automation), and leave humans to do the more big picture, high-touch tasks in an organization." [17]

- **Easy repetitive operational tasks:**

  Computerized repetitive tasks can be automatically invoked as many task as it is needed. This is one of the mos important features of workflow management because, being able to automate repetitive processes, and pre-filled forms can produce an enormous advantage. When data is entered once, it can populate multiple forms, decreases the necessity of duplication of effort and helps keep error rates down.

- **Optimized project management:**

  The successful development of a project certainly requires workflow management in all its stages. This is, for reducing the uncertainty and ensure the control of costs and risks while improving quality and efficiency. It is a reality that humans are more likely to make

mistakes than machines. An automated workflow solution mitigates these kind of dangers by reducing errors. Information systems handle data the same way every time and will drastically reduce the number of errors in a processes.

- **Improved project team work:**

  Adopting automated information systems for workflow enables to everyone involved a the project, to keep track of tasks and effortlessly communicate with the department or team working on it and be aware of their progress, it provides all with a better visibility. Workflows can easily reassign resources or update time lines, this means that the project team can devote their time to getting their actual work done rather than deciding and planning how to do something.

- **Speed in decision-making and productivity:**

  An automated workflow enables much more data and information than a person or a manual process could, it provides the possibility to, for example, pull up a quick report in minutes. This enables managers to assess the strengths and weaknesses of their workflows as needs and responsibilities change without having to go out and look thoroughly for the information.

- **Improved information availability:**

  A workflows is a way to visually communicate the process to stakeholders, given that many times stakeholders are not completely aware of the little details of the process and there are times in which the actual understanding of the processes languages is hard for them to perceive, this could cause miss-communication and mistakes when taking decisions and it could be reflected into costs or decreasing of the revenue and workflows give a solution to this, they increment the access to information. Moreover, critical processes may be reviewed at every point, ensuring that there are no bottlenecks or issues. This oversight allows project managers to determine how well the process is running from end-to-end this means that the important information of a process that may have been distributed among various staff members is now combined and available to all employees.

2.2.1 WFMS: Workflow Management Systems

A WFMS is an Information System based on the Workflow management, it allows individuals in a company to collaborate and automate one or more business processes in an standard and helpful way for the organization [16]. Workflow management systems automate redundant tasks and ensure that uncompleted tasks are investigated and take cared of. They ensure that the right information reaches the right person at the right time or that it is submitted to the right application at the right moment. This is why over the last few years, several software applications have been developed to handle workflow, many of which have evolved into image

management, document management systems, email systems and databases. The management and the execution of processes are carried by the collaboration between people and information systems (2.1), where the software allowing this collaborations are the WFMS.

This software solutions were introduced in the 90's, based on workflow engines and business rules. Their main objective was to replace the paper-based task-routing activities with automated electronic form processes. Moreover, by the late 1990s, the workflow software market integrated advanced functionality, including business rules engines, policy management, modelling tools, process monitoring, and optimization.[20].

Workflow software implementation in a company provides tools to improve productivity and reduces the time spent on manual tasks; it also allows managers to analyze each process separately, by showing them the conditions of it at any time as well as helping with accounting [20]. Moreover, the organization acquires the capability of reacting faster to change when there are necessary changes to produce on the processes.

The Modeling of workflows is one of the most important functions of the WFMS, it is the production of graphical structured representations of a process and provides some additional information about it, such as performance indicators (KPIs). They are commonly developed within a database management system and an OLAP (Online Analytical Processing). The modeling of business processes is developed in deep ahead in this chapter, inside the section BPM and BPMPN (2.4).

2.3 BPR: Business Process Reengineering

To fully benefit from Information Technology, it is necessary to address the fundamental ways in which information technology can be used to reengineer traditional processes [15] to achieve cost savings, improve customer service, and bring everything that is currently needed to all aspects of business operations in today's highly competitive global market place.

The reengineering is an administrative approach that is widely accepted among companies today, it is based on the idea of managing the processes instead of the functions, redesigning the processes of an organization with the idea of introducing small changes to carry out a continuous improvement. This renewing process is one of the management tools that emerged in the late 80's, brought out by the authors *Michael Hammer and James Champy*. They defined it as follows: [11]

> *Reengineering is the fundamental rethinking and radical redesign of processes to achieve dramatic improvements within critical and contemporary performance measures such as cost, quality, service and speed.*

The concept of change in business life is now considered essential, the rhythm has certainly accelerated and is targeting to encourage companies to the creation of initiatives capable of

achieving incremental improvements in performance, until they realize that the only way to equalize or overcome the speed of change is to make decisive and radical advances to keep in track.

It happens that companies often blame employees, managers or equipment when things do not go well, When there are situations where in fact the fault is not theirs but it is on the way they are doing things. It is also important to note that it is not because a certain process is inadequate, but it is because the process is wrong in the present, this means that it was probably designed for other conditions that occurred in the past [11]. Many processes that where magnificently designed in the past no longer respond to the present. The world changes, science and the technology advance, the customer needs are others, competitors grow and improve their approaches, the products, services and companies have to realize that they have to continuously change as advances are coming or they will be probably left behind.

In the previous definition proposed by the authors, there are four key words that are worth highlight in this document. these are: [24] **Fundamental**, **Radical**, **Dramatic** and **Process**. They are considered important because they involve:

1. Searching for the reasons why something is considered fundamental

2. Changes in the design are meant to be radical and this means that they should be from the root and not superficial

3. Expected improvements should be dramatic (not just a few percentages)

4. The changes must focus only on the processes. It can be said that a reengineering is a dramatic change in the process and as an effect of this, it will have a break in the structure.

According to Hammer and Champy, the Information Technologies play a crucial role in reengineering, especially when it is used to challenge the assumptions already inherent in the work processes. Inductive thinking is needed in order to recognise the power of the modern IT and to visualize its application. This means that instead of first defining a problem and then seeking and evaluating different solutions, it is more efficient to first recognize a powerful solution and then seek the problems that it might solve [24].

Phases for applying the reengineering process

The basic approach to process reengineering is composed of three phases, as shown in the Figure (3.1):

- Phase 1. **Discovery**: or Diagnostic. Here the company defines a strategic vision in search of determining the way in which its processes can be modified in order to reach the established strategic vision.

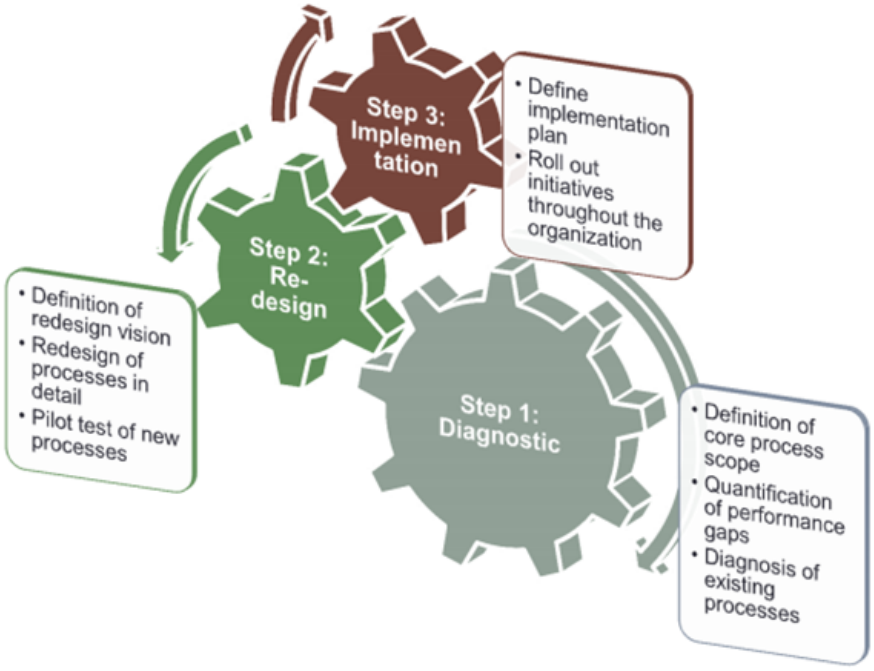


FIGURE 2.2. McKinsey BPR Methodology.
Figure reproduced from [14].

In this phase, a close look is given to the process, the requirements for the *new* process are estimated, by focusing on the needs of customers, analyzing what is and what is not accomplished by the current definition of the process, creating a projection to what is expected to be achieved by the reengineered process [23]. At the end of this step, there should be a good grip on reality. If the planning results in a desire of changing, then the team will proceed to the next phase.

- Phase 2. **Redesign**: It details, plans and organizes the redesign process.

  This phase starts with a mapping of the new process and moves to the development of a change management plan. In between these two steps, the jobs are redefined and redesigned [23], taking a careful look at the technology available and considering the organization's resources.

- Phase 3. **Implementation**: The redesign is carried out to reach the established strategic vision.

  This phase involves implementing the reengineered process. The new process is tested. [23] An atmosphere of continuous process improvement is promoted in which employees strive to make improvements that make a difference to the customer.

WRM: Workflow Reengineering Methodology uses workflow management automation to enable BPR. It is clear that information technology has been changing the entire world, and it has grown the desire to take advantage of it on any field of life. Therefore, studies are being carried, to be able to understand its possibilities and that is the reason why there is a big amount of companies performing BPR, its methodology is based on improving the effectiveness and efficiency of the business processes.

Business Process Reengineering is based under the notion that the business processes could be completely different from the present, by using and taking real advantage of the information technology available. This is why it is necessary to analyze the process and possibly, redesign it with the idea of making the information technologies the main character within the process. It requires a good frame of reference to take any kind of decision so the process can be clearly redefined and analyzed. This can be done by: [26] formal methods (identify process properties and its lacks of them), analytically methods (any kind of simulation).

2.4 BPM and BPMN

During this section there are identified the most important concepts to understand the motivation of this dissertation, the tools and reasoning of performing this re-engineering process within a company. There are shown short definitions of the concepts of BPM and BPMN that will be treated in detail ahead within this document, in the chapter BPM (3). Moreover, there are mentioned the two BPM tools considered by the company along with some characteristics. These, as well will be illustrated later inside the chapters JBPM (5) and Camunda BPM (6).

2.4.1 The Three Business Process Traditions

Companies that implement BPM improve from several points of view, it exposes weaknesses and makes stronger the most important activities. Therefore, it allows companies to be more Flexible, Competitive and Efficient. Depending on the use of the approach and its application, BPM can be seen as a methodology, as a strategic tool or as a set of technological tools. It becomes clear that the purpose of BPM is to encourage managers and decision makers to change and evolve its businesses.

There are for sure many different approaches to produce changes on business processes and, therefore many different proposals of making these changes real. Three business traditions however have been a focal point: the management tradition, the quality control tradition, and the IT tradition (Figure 2.3). Often, the businesses that used to follow just one of these traditions, find themselves afraid of including the others and so they ignore them, feeling that their approach is enough or superior but it has become clear that nowadays the trend is to merge these three and take advantage of all of their features and so acquire a more complete BPM tradition.

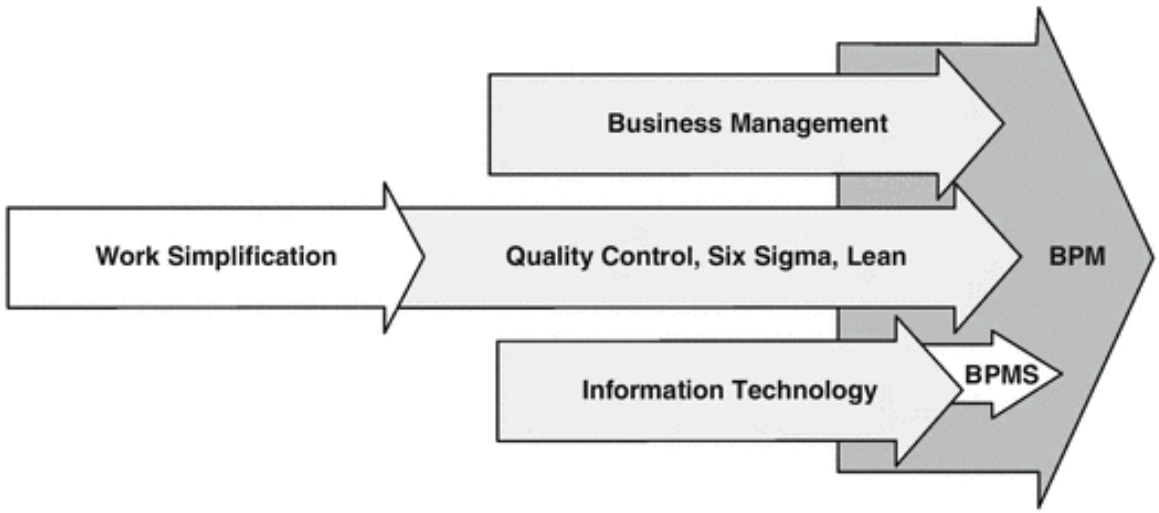


FIGURE 2.3. The Three Business Process Traditions.
Reproduced from [19].

The objective of companies, has always been the one of making workers more productive and processes simpler and with better quality. Technology has become an important tool into making this possible. The idea has been the one of applying one of the traditions pictured in the Figure (2.3) and integrating them together with the business processes. Having into account that technology changes rapidly and continuously. In the image we picture the three traditions followed by businesses to perform business management, these are briefly described below:

- **Management**: There always has been executives concerned with improving how their organizations works. However, by the mid-twentieth century, most of them were trained at business schools that did not emphasize a process approach but instead consider Marketing, Strategy, Finance, and Operations as separate disciplines. [19] Nowadays, the management tradition stresses the use of innovation to radically change the nature of the business or to give the business a significant competitive advantage. In this way they are considered as the BPM buy with technological advances it has become necessary to consider it along with the information technology tradition.

- **Quality Control**: We pictured the Quality Control tradition as a continuation of the Work Simplification and the Industrial Engineering traditions. TQM (Total Quality Management) reached the place of being the most recognized in the 70's but it was later in the 80's replaced by Lean and Six Sigma, these were offered as independent methodologies, but companies had begun to combine the two methodologies and tend, increasingly [19].

- **Information Technology**: Even though BPM started as an automation of business processes with the use of IT, it has been growing up to the point of adding human interactions in parallel with technological operations. In modern organizations, Information Technologies support every aspect of business activities, they are use for managing, processing and communicating different types of information used by the processes [19]. In fact, IT represents a core element of BPM and its capabilities include information management, processing and communication. As seeing in the picture, what becomes relevant from Information technology for the BPM are the Business Process Management Systems also known as WFMS: Workflow Management Systems (2.2.1) which are the software solutions used to collaborate and automate the business processes.

Each of these three has its advantages and all of them have been combined into what we know as BPM, which has emerged as a solution to the growing emphasis on combining the various traditions in a comprehensive approach.

2.4.2 BPM: Business Process Management

BPM can be defined as a discipline oriented to business processes, making a comprehensive approach between processes, people and information technologies [22]. It seeks to identify, design, execute, document, monitor, control and measure the business processes that an organization implements. This approach has into account and contemplates both manual and automated processes.

One important thing to keep in mind is that BPM is not a software technology, but it supports and makes use of them for its effective implementation. So BPM can be defined as a whole new category of enterprise software concept [22] that enables companies to model, implement, and execute interrelated sets of activities-that is, processes of any nature with extensions to include customers, suppliers, and other agents as participants in the tasks of the processes.

The concept of BPM is considered more in detail within the chapter BPM and BPMN (3).

2.4.3 BPM: Business Process Modeling

Business Process Modeling is an activity that focuses on the mapping of a workflow so it can be understandable for third parties apart from developers to be able to analyze it and possibly perform positive changes on it. It provides organizational improvement, efficiency and quality of the company's processes.

It is commonly a diagram representing a sequence of activities and typically shows events, actions and links or connection points, in the sequence from end to end. And provide as outcome an essential key for the business, which are: value for the customer, reduction of costs within the company, leading to increased profits and the possibility of increasing the competitive advantage.[2]

The diagram oriented representation of Business Process Modelling is commonly called notation, having an specific standard recognized as Buisness Process Modeling Notation (2.4.4).

2.4.4 BPMN: Business Process Model Notation

BPMN is an international standard used for representing business processes. It was developed and standardized by the Object Management Group (OMG). First, developed by a consortium of process modeling vendors in 2003 and then released as an OMG standard in 2006. Its purpose is to help businesses to understand their internal processes. [9]

It is essential that the business decision makers see their processes without regarding of its particular technical characteristics, this is the power of BPMN in the system development context. [9] The capture of business process information may support an information system initiative by providing rich contextual information about the landscape of the process.

The concept of BPMN is considered more in detail within the chapter BPM and BPMN (3).

2.4.5 JBPM

JBPM is a flexible Business Process Management suite, an extensible framework and workflow process engine written in pure java and fully open source, distributed under Apache license. [13]

It is able to execute business processes which are designed with BPMN 2.0 standard and also monitor them. Enables the management of process definitions and the possibility to inspect and manipulate runtime instances.

The framework is composed by several components, mentioned inside the chapter JBPM (5). The only mandatory component and the most important of them is the *Core Engine*, followed by the optional components which are an Eclipse-based or web-based designer and a management console. The core component can be embedded as part of the company's application or deployed as a service.

The concept of JBPM is explained more in detail in the chapter JBPM (5).

2.4.6 Camunda

Similarly to JBPM (5.1), camunda BPM platform is a flexible framework for workflow and process automation. Its core is a native BPMN 2.0 process engine that runs inside the Java Virtual Machine. It can be embedded inside any Java application and any runtime Container [4].

Its main component is a process engine. Additionally to it, there is available a set of tools for human workflow management, operations and monitoring. Its set of applications running in the core engine, are presented to users for modelling, execute and administer an application process.

The Camunda BPM engine is shown more in detail, ahead inside this dissertation, during the chapter: Camunda BPM (6).

Chapter 3

BPM and BPMN

Insurers are now seeing the BPM as a useful tool that can help improving processes in this highly competitive field and, right now it represents a crucial instrument to keep in track with what technological improvements that data management systems are bringing.

During this chapter there will be presented, more in depth some characteristics of the BPM, giving also relevance to the Business Process Modeling and Business Process Modeling Notation which are the center of the design of processes and on which is based this dissertation. First, will be describe the whole picture of the process management (3.1) getting into detail about its features and highlights that could be benefit the company of rgi and in general insurance companies. Moreover, in the BPMod (3.2) section it is presented the idea of how important it is to model to provide a common understanding between parts of an organization, presenting the main characteristics and specifications on the way these models are presented (3.2.1).

3.1 BPM: Business Process Management

"The Business Process Management is the discipline that combines knowledge from information technology and knowledge from management sciences and applies this to operational business processes." [25] The concept has become important and got considerable attention during the past few years given that it has shown results, for different kind of companies, of significantly increasing the productivity and saving costs [25]. Today, innovation in computing and communication are still the main features behind change of processes, they have become complex and with a really strong bond on information systems.

The BPM can be seen as a set of activities that aim to transform business processes in the way that they can be more effective within a company, these activities are based on defining, optimizing, monitoring and integrating the business processes of an organization to proportionate all the benefits related to a company; the goal is to achieve the organization objectives by aligning the processes with it.

FIGURE 3.1. BPM Chart [20].

Features of BPM [22]

- BPM considers it fundamental to **monitor** the process to be measuring its performance and detect possible failures. Monitoring can determine whether the process generates expected results based on business objectives. The creation and use of metrics and Key Performance Indicators (KPIs) are the key to a detailed control of each process.

- Given the external dynamism to which companies are exposed, it is necessary to have detailed **documentation** of each organizational activity. BPM promotes the understanding and modeling of all processes through documentation. Leaning on process modeling software tools this point can be achieved efficiently.

- Another important aspect is the **automation of processes**. This is something that every company wants to achieve to improve its operations, reduce costs and increase profits. The key question that many forget, is that before you automate any process you first have to understand and improve it.

3.2 Business Process Model

The business process modeling enables a common understanding and analysis of processes within an organization. It is a discipline used to define, and outline business components such as: processes, practices, information flows and systems; including standards to better represent these components. It represents a relevant tool for the comprehension of the activities that business

runs, and the kind of information that a company needs in order to successfully engage it in those activities. *"It is used to map out an organization's current processes (as-is) to create a baseline for process improvements and to design future processes (to-be) with those improvements incorporated" [21].* A company can be analyzed and integrated through its business processes, this is why it is important of correctly modelling them. It is crucial to define them by using the right models and taking into account technologies and tools.

3.2.1 BPMN: Business Process Modeling Notation

Process modeling often uses Business Process Modeling Notation (BPMN), a standard method for illustrating processes with the use of diagrams [1]. These should be understandable by all business users, from the business analyst (who create the initial drafts of the processes), to the technical developers (who implement the technology that runs a determined process) and to the business administratives (who manage and monitor). The BPMN is a global standard and one of the most important aspects of a successful IT-Business.

The usage of this standard is growing with the passing of the years, and this could have the following reasons [4]:

- **Standard:** supported by many software products and therefore the company is not dependent on a particular vendor.
- **Simplicity:** easy and understandable to work with it.
- **Power of expression:** enables the possibility to describe precisely how a process works.
- **Implementation in IT:** BPMN has been developed primarily to support technical implementation of processes to automate them.

The first specification of the standard was the BPMN 1.0, released to the public in May 2004 and it was updated on January 2011 by the name BPMN 2.0. [6] its definition is based on creating diagrams based on a flow-charting technique, illustrating business process operations. with the goal of making the processes understandable for all people related to a business, creating *"a standardized bridge for the gap between the business process design and the actual process implementation"* [21]. These diagrams are a composite of several elements which enable the easy development of simple diagrams to make them distinguishable for business analyst. This means that it provides simple mechanisms to create business process models while at the same time enables to handle the complexity inherent to them.

Within the basic categories of elements, additional variation can be added, to support specific requirements however, not with the intention of dramatically changing the basic look of the diagrams. The categories of elements are the following, with its different possible specifications:[6]

- **Flow Objects:**
  - Event: Situation that happens during the course of a business process.
  - Activity: Work that company performs.
  - Gateway: Controls the divergence and convergence of Sequence Flow.
- **Connecting Objects:**
  - Sequence flow: The order in which activities will be performed in a Process)
  - Message flow: Flow of messages between two separate Process Participants
  - Association line: Associates artifacts with flow objects.
- **Swimlanes:**
  - Pool: Participant in a process.
  - Lane: Sub-partition within a Pool.
- **Artifacts:**
  - Data object: Shows how data is required or produced by activities
  - Group: Used for documentation, not affecting the Sequence Flow.
  - Annotation: To provide additional text information for the reader of a BPMN Diagram.

It remains clear that BPMN has brought to industries an easy, understandable and maintainable way of representing and handling with processes by creating a link between technical individuals in charge of implementation, with the business administrative people of an organization.

Chapter 4

RGI Group

During this chapter, it is described all the information related to the company RGI Group where this dissertation is being carried out. It is a recognized company in Europe and for this reason, it is worth highlighting the way how they implement the workflow to handle claims during the development insurance business. All in charge of the claims department who is implementing the migration process. In first instance, it is presented an overview of the company (4.1), followed by the company's workflow implementation (4.2), then a brief description of its products (4.3) to finish then with an specification of the workflow processes that are going to be updated during the development of this process (4.5).

4.1 Organizational Description

Along this section, there are illustrated some characteristics of RGI as a company, this is something to focus on, given that in the past few years it has been growing strongly and now it has become a recognized company in the insurance domain not just in Italy. First it is presented some description about the company (4.1.1), then a brief description of the company's mission (4.1.2) and vision (4.1.3). The information exposed along this section has been taken from [10].

4.1.1 About the company

RGI Group operates in an insurance sector that will increasingly require high-tech and innovative IT solutions to increase the efficiency of the operations of insurance companies both in the outdoors (customers and networks) and in their own (back-office).

The company is an Independent Software Vendor, a European leader in the digital transformation of insurers. It has been a technologically innovative company since its inception in 1987 in Ivrea, Italy. This means that, for 30 years it has been growing to be a solid point of reference for the development and implementation of modular insurance policy administration information systems solutions, this means in the provision of software products and technological

services specifically for the insurance sector such as insurers, Bank-assurance, agents, brokers and financial consultants.

With a team of professionals specialized in IT and in the insurance business, composed of 12 offices in Italy, Ireland, France, Germany, Tunisia and Luxembourg, RGI has digitized the business of over 90 insurance companies and 300 brokers across the EMEA(Europe, Middle East, and Africa) region.

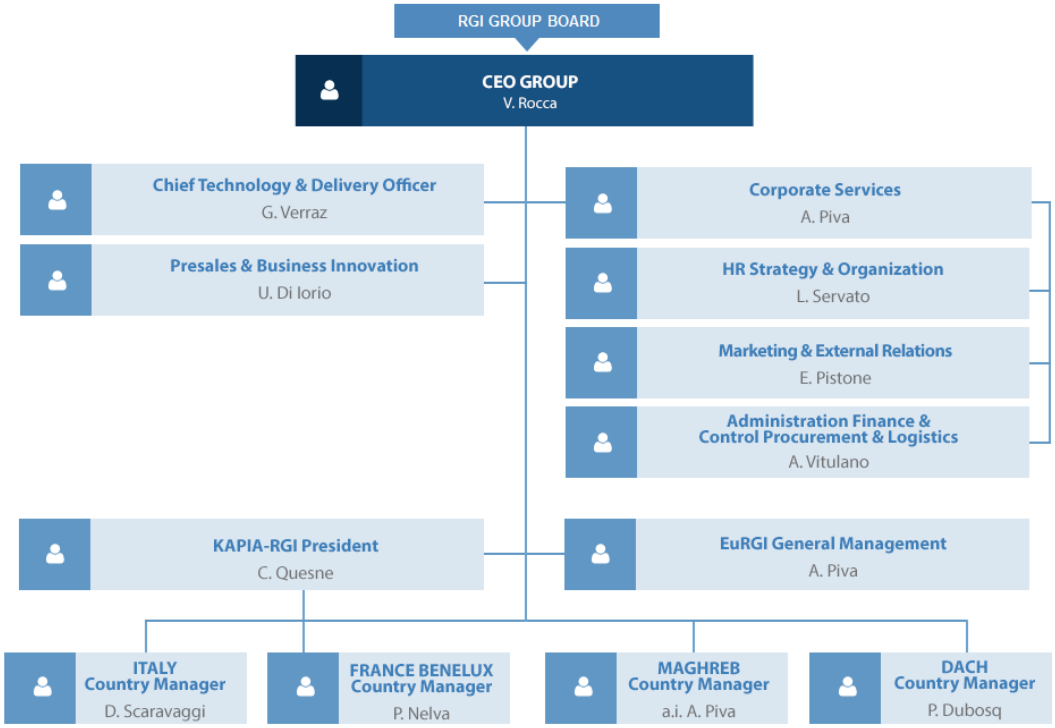


FIGURE 4.1. Organizational Chart.
Figure reproduced from RGI internal documentation.

The Figure (4.1) represents the organizational chart of the company, where the top element is the RGI Group Board, in charge of taking the main decisions for the company, followed by the main departments and then by the different organization in each of the countries in which the company works, the project in which this dissertation is based focus itself in the implementation of a migration plan inside the Claim Management department of the Italy sector of the company, as explain in the Claim Management section (4.2) . Regarding its size, it is to say that it can be cataloged as a big-size company given that its number of employees goes in the range of 501-1000 units: "RGI Group has over 680 employees spread over 7 Italian locations and 5 foreign offices. It has achieved about 50 million euro in turnover of which 90% is in Italy" [12].

4.1.2 Mission

The company has always paid special attention to technological development and the quality of the tools it offers, in order to ensure not only high performance, but also speed of implementation, short release times and rapid and effective support services. [10]

It is looking to be a reliable partner and one of the most innovative and influential companies in the insurance industry, able to support their customers at all stages of organizational technological innovation and in the constant changes imposed by the market today.

4.1.3 Market focus

RGI has an exclusive vertical focus on the insurance industry and specializes in the development and implementation of modular Policy Administration System insurance solutions for all distribution channels and all business lines. Its strong orientation towards technological innovation and its exclusive focus on the insurance industry are the foundations that have enabled RGI to develop and diversify its products, achieving excellent levels of quality in the solutions and high value-added services it provides. [10]

4.2 Claims Management

In the insurance business, the claim is considered one of the most important units and it requires to take special attention to every stage when handling with it. *"A claim is the defining moment in the relationship between an insurer and its customer. It's the chance to show that the years spent paying were worth the expense. If a claim is handled well, retention rates may rise. If handled poorly, the insurer may not only lose the customer, but also damage its wider reputation."[18].* This is why insurers invert on it big amounts of money up to the point in which commercially, claims are considered by far the highest single cost in the field. In the other hand, there is a constant dispute between the insurers and their suppliers and it could affect efficiency, this is also because the ones taking care of repairs or outsourcing services have not real intention of cutting down their prices. Costs can also increase with a bad handling of claims because there could be the situation in which accepting a fraudulent claim and paying for it can be done without even noticing it and this is a huge risk that insurers aim to avoid because expenses within this kind of situations could be considerable. These are some reasons why insurers are starting to change traditional acts and they are putting their mind into using sophisticated, risk-based decision-making techniques such as automated information systems inside the claims department.

To acquire the benefits of greater control, RGI has given to the claims department a new meaning and has re-thought its role within the company, seeing it as an important key that can bring real value to the business instead of considering it only with a back-office role. That said, it is opened up the discussion to some characteristics of the claims department activities. They

are in charge, apart from other functions, of managing the ***workflow***, this is, the set of processes that interact with the claims (as said before, the most important unit of an insurance company). This processes are explained ahead in this chapter (4.2.2).

4.2.1 RGI processes

The company divides its business processes as shown in the Figure (4.2), these are: CORE processes, SARC and specialized processes, administration and support processes, and control processes. all of these are important to the company and considered inside the migration plan to Camunda BPM (6). However this dissertation focuses its implementation in some of the ***Core Processes*** and the ***Support processes***. For the second set of processes, there will be taken into account the processes related to deadlines.

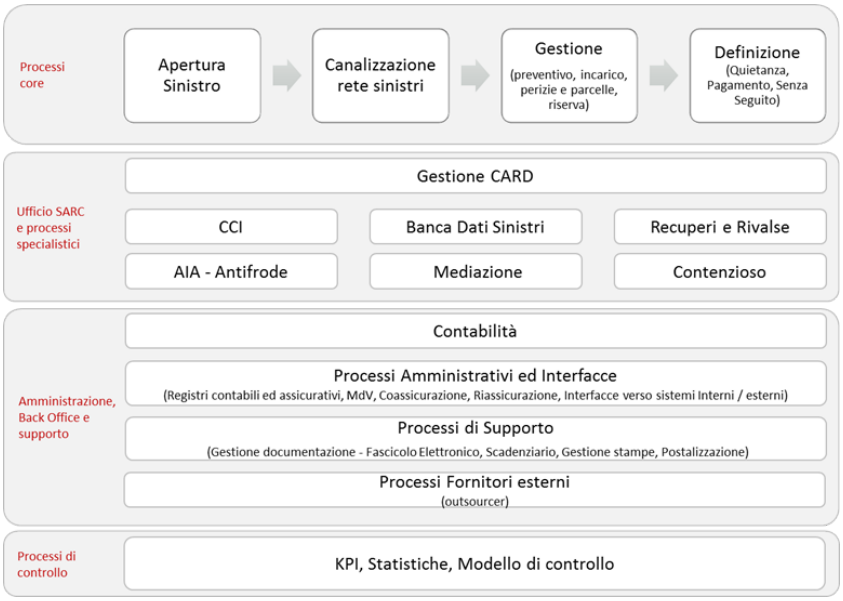


FIGURE 4.2. RGI Processes.
Figure reproduced from Internal documentation of RGI.

It is important to mention that the migration considers all of the company's processes, this is to give the whole picture of the magnitude of the project inside the company and the relevance that it has within the organization, all taken in charge by the claims department.

4.2.2 Workflow in Pass

The Workflow processes define, through a set of procedural rules, the activities related to the **business processes**. These, at the same time involve several Employees and working Groups, all with different functions within the company.

PASS is the prefix received by all products, services and components inside RGI. The *workflow in Pass* described in this document, considers all processes related to the current implementation of the migration from JBPM to Camunda BPM, this is the Support processes which in turn, are considered inside three sets of processes: Documentation management, Deadlines, print management and mailing (also shown in the Figure (4.2)). Some of the processes have different functionalities and so they can be considered in more than one of these subsets.

Each process can be composed by several tasks assigned to different groups or users inside a group, it can be activated though both on-line functionalities and batch procedures. Individual tasks can be performed manually, via an operator's intervention, or automatically, by computer applications (timers, system events, external flows, and so on).

There are some specifications that concern the design of processes, the tasks inside the processes and their different behaviour. these should be taken into account during the redesign phase of the reengineering process. The users may belong to one or several groups, the activities based on the process design can be from different types:

1. Functionality or **navigation already available** on the system
2. **New navigation** that make use of pages from the system
3. **Alerts**

Each task may be from one of the following three types: **Personal**, this means that it is assigned directly to the user, it is visible just for the operator of the task. **Not assigned** these are just assigned to a group that the user is part of, this type of task is visible by all of the users of the group. And, **Assigned**, these are to be handled by group users to whom the operator belongs, in other words they are assigned to another user of the same group. Visible also by all of the users of the group.

Deadlines within a process have big importance, they are necessary because when talking about manual tasks, there could be the possibility of an assignee not to perform anything on the task for a long period of time and the claim would never be handled, this would make the company to loose profit.

Process variables are defined for each process, it is possible to apply predefined views or filters which are configurable to process variables and, it is possible also to define different areas to associate individual processes.

4.3 Products

RGI has a set of products offered to insurers, Bank-assurance, agents, brokers, financial consultants and more, inside the insurance domain. These are all contained into **PASS_Insurance** and here they are grouped into suits depending on their orientation and purpose. Along this

section there will be described the core of the company, evidencing that it has a strong focus on multi-channel environments, usability on the most modern technological devices and ease of integration. Things that have made of RGI a recognized company within the domain.

All the information presented during this section has been reproduced from RGI internal documentation and the RGI web page. [10]

The PASS_Insurance Core is the Policy Administration System, it is thought to be a multi-company, multi-country and multi-lingual suite for the integrated management of the different products. The strong configurability of the software and architecture means that the system can be pointed to, or used for the organizational requirements of the various insurance companies, which can adopt innovative models and adapt the products to what they are looking for. PASS_Insurance Core consists of a number of stand-alone modules divided into four business line:

- Non-life (Motor and Damages Classes)
- Special Classes (transport, bonds and hail)
- Life
- Claims

The features of the RGI PASS suite allow insurers to gain an advantage not only in terms of business, but also through improved relations between companies and their customers. The Core is divided into five different branches of products, these are: PASS_P&C (4.3.1), PASS_Life (4.3.2), PASS_Products (4.3.3), PASS_Broker Evolution (4.3.4) and PASS_Claims (4.3.5) and an additional component which is the possibility of adding individual fragments named Add-On Modules (4.3.6). It is necessary to emphasize that this dissertation is focused in detail just in the PASS_Claims product (4.3.5) and specifically on just some of the processes it involves (4.5). However, there will be presented a brief description of all the company's products because it is important to remember that the migration project that is taking place within the company involves each an every process and all of them will be affected by the same kind of modifications.

4.3.1 PASS_P&C

PASS_P&C is the PASS_Insurance component for the end-to-end management of the activities of the *Non-Life branches*. These activities are: PASS_P&C Motor, used for the management of Motor insurance, PASS_P&C No Motor: applicable for the management of Damages insurance and PASS_P&C Group Policy which is handy for the module for the management of Group policies. The product has acquired the following characteristics that enable the outstanding of the company in comparison with its competitors

- Complete: The management of all processes of the Non-Life branches, in Individual and Collective forms
- Flexible: It has multi-company and multi-languages solution that support Directional/Non Directional activities. Very wide opening to integration with customer applications.
- Multi-channel: The front end is web based. It has high-profitability for product/channel at multiple levels. Several kind of users
- Open: Multi-platform: J2EE scalable architecture
- Cost Reduction: Improvement and simplification in operations, and increase in the automation level
- Omni-device: The system is accessible via any device thanks to the innovative front-end that enables Insurers also to perform operations in mobility

4.3.2 PASS_Life

PASS_Life contains all the modules that offer insurers the management of the activities of the *Life branch*. Activities such as: PASS_Life Base: module for the management of Life insurance, PASS_Life Annuity for the management of Annuities and PASS_Life Group Policy for the management of Group policies. Likely to PASS_P&C (4.3.1), the product offers to customers some benefits. It is also complete, flexible, multi channel/platform, it helps the company too reduce costs and can be used by means of the newest technological devices.

4.3.3 PASS_Products

It is the heart of the suit PASS_Insurance, it allows the design and complete management of Life and Non-Life insurance products, without any limitation in the number of guarantees, insured assets and parameters in the premium calculation rules. In addition, for Life classes, it governs the characterisation of all the specifics associated with investments, rates, coupons and quotes. This product is integrated inside the Policy Administration System but can also be used in stand-alone mode.

4.3.4 PASS_Broker Evolution

PASS_Broker Evolution as its name says, is the management system designed to meet the requirements of brokers. It is a fully web-based management system for insurance developed with Microsoft technologies. It enables users to: Have a single view of their portfolio, integrate the entire digital evolution (mobile devices, electronic payments, digital signature and any paperless), be more compliant with regulations, increase and facilitate collaboration between all stakeholders

and integrate easily with third-party applications. Some benefits that customers acquire when implementing the PASS_Broker are:

- Customer-Centric view: customer's card for browsing and managing all data.
- Modular management: gradual activation of the required modules
- Sales network: management of staff levels, with separate setting for commissions payable
- System integration: direct integration with Microsoft Office Automation environment
- Paperless: compliant optical storage, biometric signature, digital signature, certified email management, dematerialization of documents
- Workflow: management and planning of the activities to be performed by a single group
- Multilingual: Multilingual and multi-company management at user level
- IT optimization: importing of data from company flows
- Messaging: management of communications via email and sms, internal chats, social networks, management of campaigns and dashboards using CRM

4.3.5 PASS_Claims

PASS_Claims is the module that allows the management of the entire life cycle of Motor claims and Insurance Damages. It ensures complete management of the insurance claim, from first notice of loss to settlement, with the possibility of monitoring the evolution of the claim. The system allows for the detailed mapping of risks, with evidence of contractual limits and definition of the damage. In this way, the cost of the claim can be correctly allocated with monitoring of liability, excesses and deductibles. It also handles completely, less complex claims in a total automatic implementation and supports users in the management of the more complex ones. Some characteristics for outstanding the process are:

- Complete management: Non-Life claims handling from First Notice of Loss to settlement
- Partners coordination: Coordination of interactions among all involved actors and during the whole claim life-cycle
- Message automation: Automation of all communications (faxes, letters, registered letters, email, sms) and digital management of documents
- Native integration: Native integration with all PASS modules without any duplication of components

- BPM Management: It is a processes driven by the Business Process Manager (BPM) and monitored through task list and activities scheduling

By looking into this product, it becomes necessary to emphasize and demonstrate the idea that ensurers look for the automation of claims management because, as explained in the previous section of (4.2), Claims have to be a focal point because they influence in big proportions, the cost and revenues within the company.

A more detail specification of the pass_claims product, getting into detail of its processes and its functional specifications, is presented ahead during this chapter. More specifically, inside the section *Workflow on PASS_CLAIMS* (4.5).

4.3.6 Add-On Modules

These modules of RGI are stand-alone, able to meet the needs of all players in the insurance industry. However, they can also be used in combination with others, the Cross modules are common to the various business lines and are dedicated to the management of the database, accounting, reinsurance, printed matter, statistical reports and business analysis. The multi-channel, ease of integration and usability are the distinguishing features. These modules are:

- *PASS_Bonds* is the module for Bonds. Its features are contain: the management of credit, the lending process, the control on credit lines and customer status and the management of beneficiaries.

- *PASS_Transports* is the module for Transport. It provides the following cover for both group and individual policies: Goods, transportation liability and own damage.

- PASS_Party is the PASS_Insurance Core module dedicated to the party management. It has been designed specifically to manage information required to describe and manage (physical or legal) persons.

- PASS_Reinsurance is the PASS_Insurance Core dedicated to the Reinsurance management.It makes it possible to manage the entire cycle of outward reinsurance for the Non-Life and Life branch. This module covers the requests concerning the fulfillments considered in compliance to regulation.

4.4 PASS_CLAIMS System

Pass_Claims has been completely developed in java, on a web-based architecture, it is portable on the different platforms and the relational database. It uses a Three-tier architecture and therefore the following layers:

- **Presentation** considering the components in charge of generate the GUI for the company's client. In general, it is a web application in charge of managing presentation, with a general design but with different views and aspects from client to client. It could also consist on an application java or an applet.

- **Business logic** consisting on a set of components that contain the application logic of pass_claims. It represents a key for business problems resolution and development of application services. All these on a J2EE platform, through java beens EJB.

- **Data Access** for the integration with the database, J2EE platform provides a JDBC api that enables accessing of data, a JMS api for the communication with other systems and a transaction manager to coordinate them.

4.5 Processes on PASS_CLAIMS

The processes that conform the *Pass_Claims* product (4.3.5) have some characteristics regarding its automation. This are key points within the reengineering process that is being carried. This is, because they represent a crucial point within each process and also determine key differentiators for the company's competitors. Efficiency and performance are surely a highlight point in the insurance domain.

The Claims system offers the capabilities of handling complex damage claims and in general active and passive claims, these in the phases of management and Back-office functionality of the business. Having into account also the flow management to institutional entities, monitoring reports and in general, the analysis dashboard. The KPIs can be managed through the data analysis platform integrated with the system.

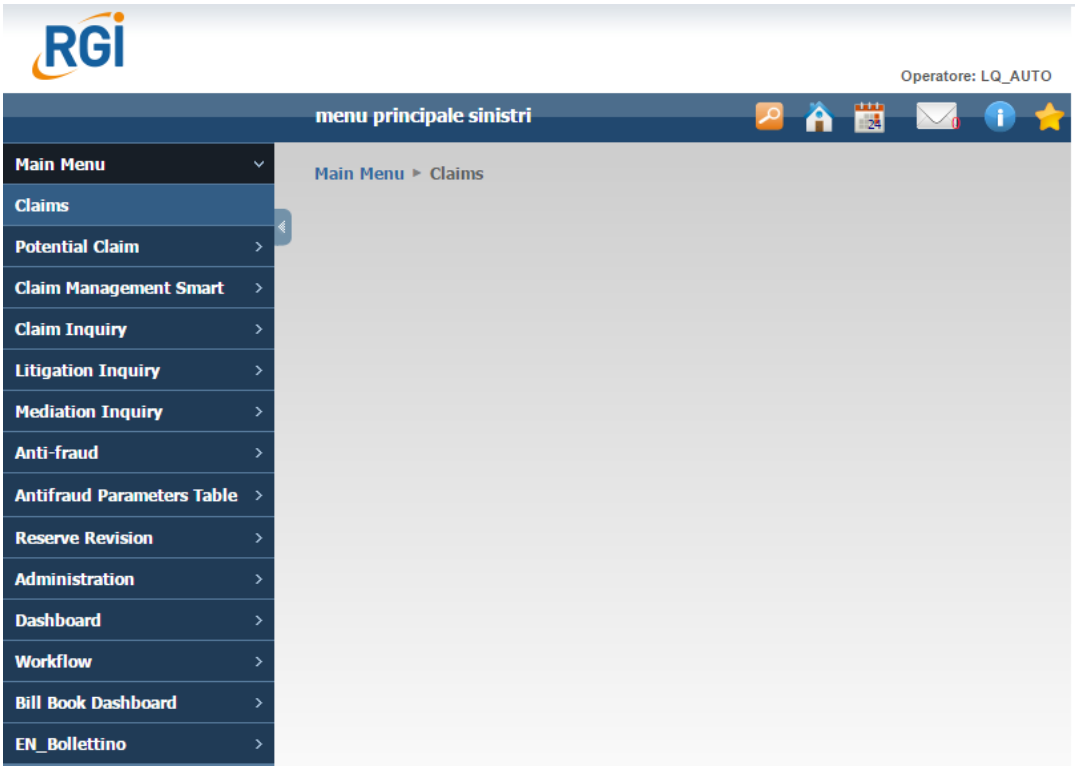


FIGURE 4.3. GUI Claims.
Figure reproduced from RGI System web application.

The user interface follows the Pass Application Standard inside RGI, this is as shown in the Figure (4.3), it has a menu on the left that lets you navigate by accessing a specific data area and the management functions linked to it. The top area shows the selected feature and the connected user.

In general the processes are directly installed in the system through the user interface. It is possible to configure the process filters and views, set up areas and groups of users according to the client need and the insurance domain requires. For example, users can be divided into Claim handlers, broker or company managers.

As explained in the section related to WFMS (2.2.1), the theory and applications of the workflow management promote the idea of collaborative workgroups interacting with the activities that conform a process, each of which is a work to be done to achieve a common goal. In the specific case, PASS_Claims as an application layer that deals with the use and presentation of the results obtained by web services and interaction of users. To access process and environment management, it is necessary to select *"The workflow"* entry in the Main menu of the web application. The main idea is then, the following: each process can be activated following its normal flow (actions performed by a determined user in determined conditions) or it can also be initiated by means of *"The workflow"* which is a section within the system to handle the business processes.

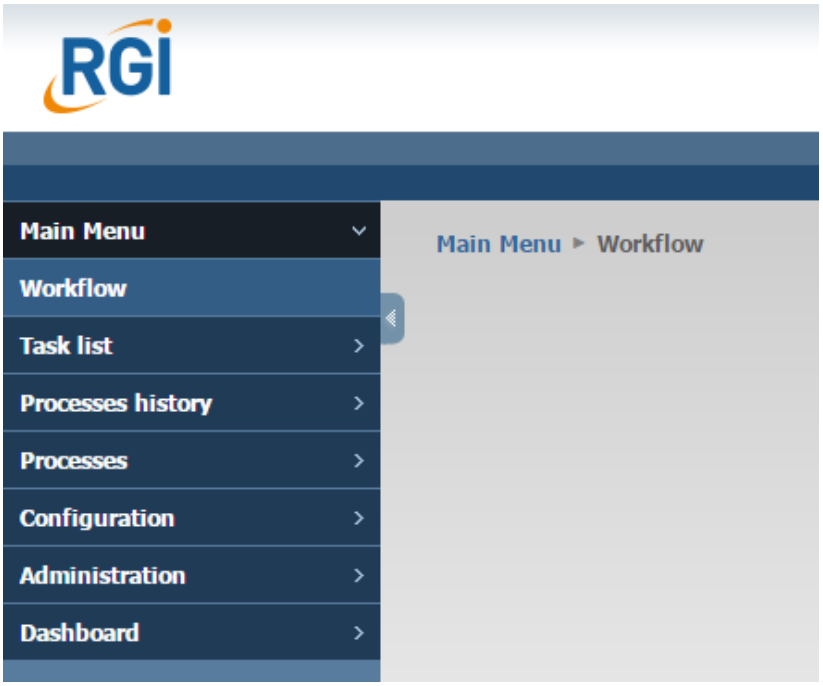


FIGURE 4.4. Workflow Menu.
Figure reproduced from RGI System web application.

It results useful because it offers some quick functionalities, as shown in the Figure (4.4) these functionalities include the configuration of groups and the administration of processes. These allow the selection of groups that can have access to process specifications, deletion of a process from the system and the possibility to upload and update new versions of them.

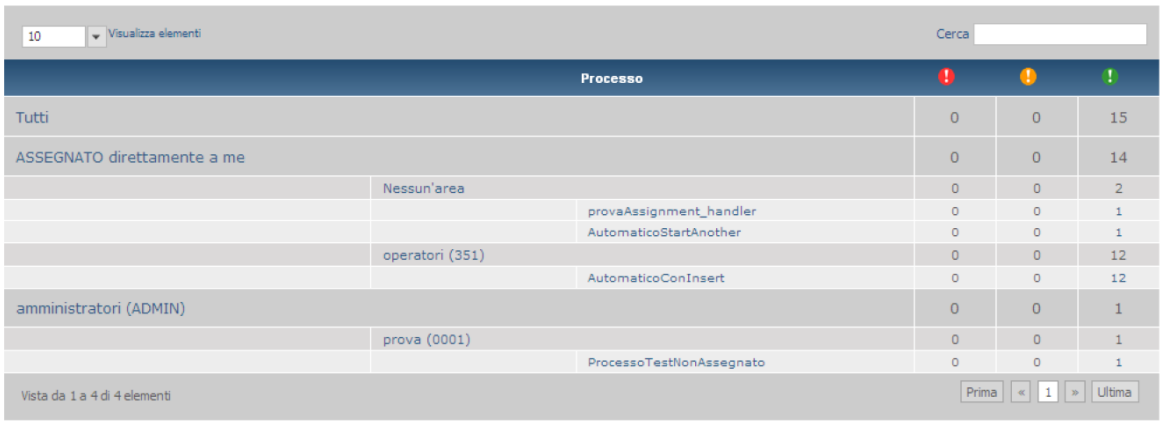


FIGURE 4.5. Summary of Active Processes.
Figure reproduced from RGI System web application.

When deciding to see the tasklist, either selecting personal, not assigned or assigned, the system will show something similar to what is shown in the Figure (4.5). Here, the system displays the summary of active processes, where you can select a group, area, or process for then open the view with the list of tasks that are part of it. As the Figure shows (4.6), here it is presented all the relevant functionality of the claims system and it is worth highlight within the scope of this dissertation, because of the concept that it represents. When selecting the tab of *Task List* on the workflow menu, the user will have access to what is known as **Task List** or Work Queue, this queues are used to show to each user, the processes that are waiting for a manual intervention and that has to be carried so it can be either executed or transferred to another assignee belonging to the same group. On the task list, the user can also choose the option to see the graphical representation of the process. On the top, the system shows to the user the count of the task inside the list, divided into priority levels (red for high priority, orange for intermediate priority and green for low priority).

In the task list, the system displays: A little table in which task count is divided by group and priority. It is a section containing the following folder tabs:

- Search: Filter the tasks in the list by selecting a custom filter (see Filter Configuration) or displaying a range of creation / expiration dates;

- Views: Changes the displayed columns by selecting a custom view (see Viewing Configuration);

- Actions: This allows you to Massively performs actions for taking in charge, group release, and assignment to multiple tasks at a time.

- Timetable: Filter the tasks listed by indicating a day, month, or week within which the date of creation or the expiration date of the task falls.

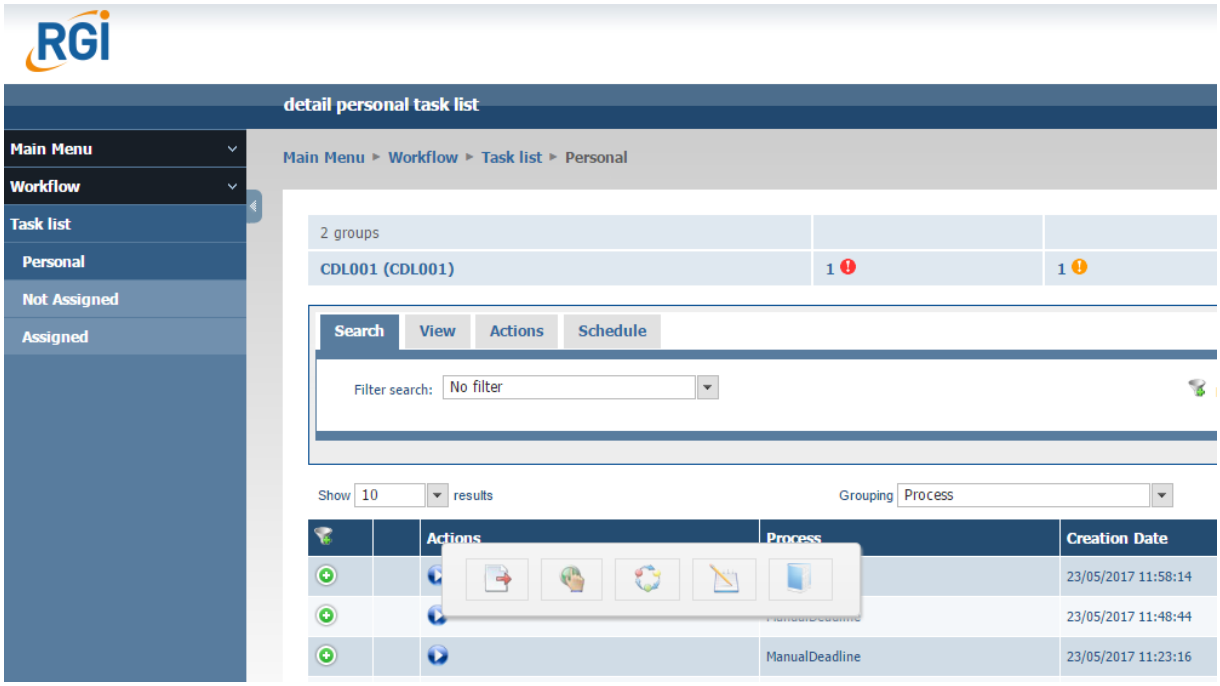


FIGURE 4.6. Workflow Task List.
Figure reproduced from RGI System web application.

By selecting the blue button with the white arrow in the middle, on the record of the activity involved, the system enables operations that are consistent with the status of the activity and the role assumed by the user within the group. Specifically, it is possible to select the following options: **Display** the design of the entire process; to **execute** personal or unassigned tasks, so that the process can advance to the next step; to **move** personal tasks into the queue of unassigned tasks (the user will no longer be in charge of the task); to **take in charge** unallocated tasks (the task is moved from the queue of tasks not assigned to that of the personal tasks and the user becomes the task manager); to **reassign** tasks to a group user (usually the function is only enabled for group administrators); to add or edit notes and to manage documents.

All the workflow processes of RGI share the characteristics mentioned and they are accessed and interact with the user of the web application through the same functionalities but depending on the type of process and the permissions and profile of the user. During the following subsections each of the processes are presented with its particular characteristics as well as the user interactions that require.

4.5.1 Administrative Cover Check

This process starts when there is a presumed insufficient administrative cover on a policy related to a **Potential Claim File (PCF)**, which needs to be checked given that a user has selected it

to perform a claim opening operation. At this point, the system will perform a set of automatic task to activate finally a navigation task inside the task-queue of any other of the network policy agent users, who will decide if the task will be carried out by him or by other specific user. If he decides to take the task, he must execute it, then select the option accordingly with his/her criteria or consideration about the policy and decide if the opening of the PCF can be done or not. If he does not take the task to himself then he must select a user inside the group and this person will have the activity added inside their Workflow queue.

Before finishing, the process must go on by the system performing some other automatic tasks in which the agency related to the policy is informed with the decision previously taken, by means of an e-mail and also the log operation is registered inside the agenda of the PCF entering the name of the process activated, the decision taken, the user opening the claim and the date.

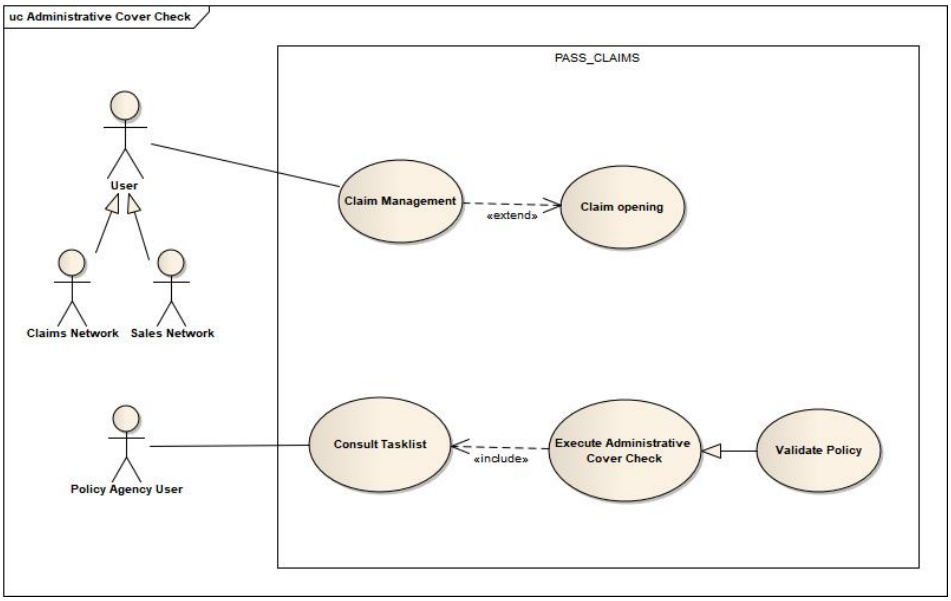


FIGURE 4.7. Use Case Diagram: Administrative Cover Check.
Figure elaborated with Enterprise Architect tool

Use Case Diagram As shown in the Figure (Use Case Diagram: Administrative Cover Check 4.7) the user, taking place on the claims or sales network, is able to perform the activity corresponding to the first part of the process which is the opening of a claim which does not have a cover yet. In the intermediate stages of the Administrative cover check another user, with the role of policy agent, is able to validate the policy so the opening of the claim can be correctly executed.

4.5.2 Notify Take In Charge

The Notify take in charge process performs the acceptance of a claim into the system, its purpose is to notify the relevant claim handler of the arrival of a new file to manage and also tracking its acceptance. It can be started in three different stages: 1. In the moment in which a handler/agency user attempts to open a claim, 2. On entering a new type of loss on a claim that is already open, when there is no active scheduled process already existing for that claim handler-claim. 3. On manually transferring a type of loss/position/claim from an assignee to another. Then, it runs and automatic task to register in the agenda the starting of the process instance and the a new task is added to the handler's queue.

At this point, the assignee who has the task, can executed it by means of three different actions:

- Manage: Leads the user to the Claim Management, and here he is allowed to perform different operations aimed at processing the file, according to what it is defined in his/her functions list. After this the task is completed and disappears from the queue.

- Transfer: This option is displayed just in the case in which the user is authorized for the manual transfer function. Information about the transfer is compiled and then, the task is removed from the workflow queue just if all types of loos have been transferred.

- Exit: Allows the user to exit the work queue, to postpone the completion of the work queue to a later moment.

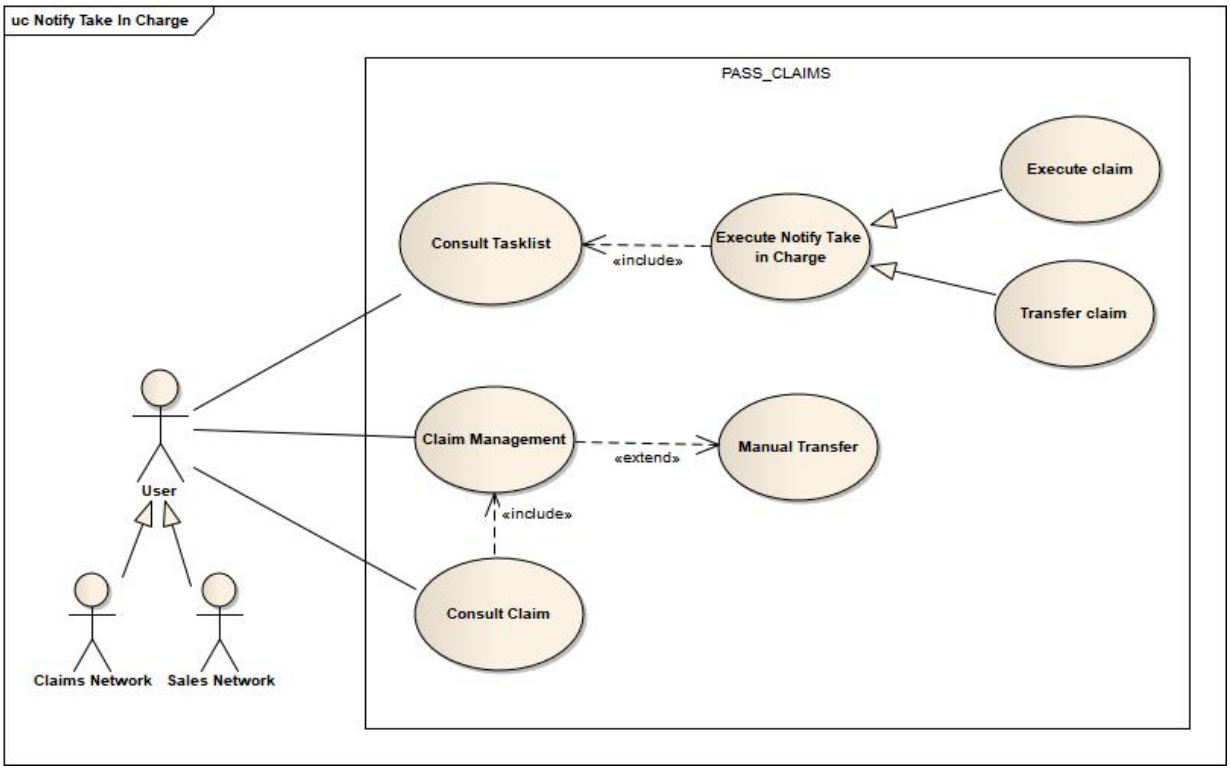


FIGURE 4.8. Use Case Diagram: Notify Take in Charge.
Figure elaborated with Enterprise Architect tool

Use Case Diagram As shown in the Figure (Use Case Diagram: Notify Take in Charge 4.8), the user takes place either in the Claims network or in the Sales network, this means that the process can have interaction with a person belonging the claims department of rgi and also by a person owning the rgi's claims product. At this point, the user is able to perform the activities corresponding to the first part of the process, which are: Performing a manual transfer of a task within the process, so it can be executed by any other assignee, this by inserting the identification of the one that will take the activity so the system can recognize the user and can add the task to its corresponding tasklist. On the other hand, the user takes in charge the claim by accepting the notification and hence the current state of the claim.

4.5.3 Payment Deadline and Position Communication

The two processes, Payment Deadline and Position Communication, are described inside the same section because they are closely related between each other: the Deadline process can be started by the position communication and the two processes together share the calculation of the deadlines of the system.

The objective of both of the processes mentioned, is assisting the liquidator in calculating and respecting the *legal* and *conventional* deadlines set previously by the Company following the internal regulations for the communication to decide which position to take on an specific damages request. Both of them are composed by several stages that enable the illustration of the different flow of information that the user or the system can follow according to the user's choices and to some events from the outside of the process (batch processes that the company uses).

Position communication

The process is started with the objective of monitoring the deadlines, which can be *legal* if the cause is associated to a damages request so it can relate the management of legal terms when the company takes a position in order to prevent the damages reimbursement request. Or, it can be *conventional*, if the cause has not been associated to a damages request. The starting event of the process is the opening of a new claim, or by modifying an existing one in the way that the claim end up missing a Request of damages. The process can be started at two different points in the flow: In the opening of a new claim and, during the save operation at a later time if the process had not been started earlier and there are the conditions to start it now.

The purpose of the process is to guide the liquidator in order to enable the management of the claim between the conventional deadlines defined by the company. The deadlines are predefined values corresponding to the typology of the claim (different values depending on the type of damage, type of claim, policy and the offer made). In the case there is an incomplete claim, the payment terms are suspended, in case the process receives notification of the request for data integration then, the payment terms are reactivated or restored in case the expiration process receives the reporting of the data completion of the complaint.

The process is handled at the level of Damage Causal, this means that each instance created in the task list of the liquidator, is related to a single damage causal.

At this point, the system allows the user to take a position under conventional deadlines. Inside the process execution, the user can determines what to do with the damage request. This is, the user decides if to follow a dispute, make an offer or issue a receipt. In case this process is an offer, there is also the verification related to the user's permissions to do it and so eventually, the respective authorization process runs. Instead, in the case the process is the issue of a receipt, the process to start is payment deadline.

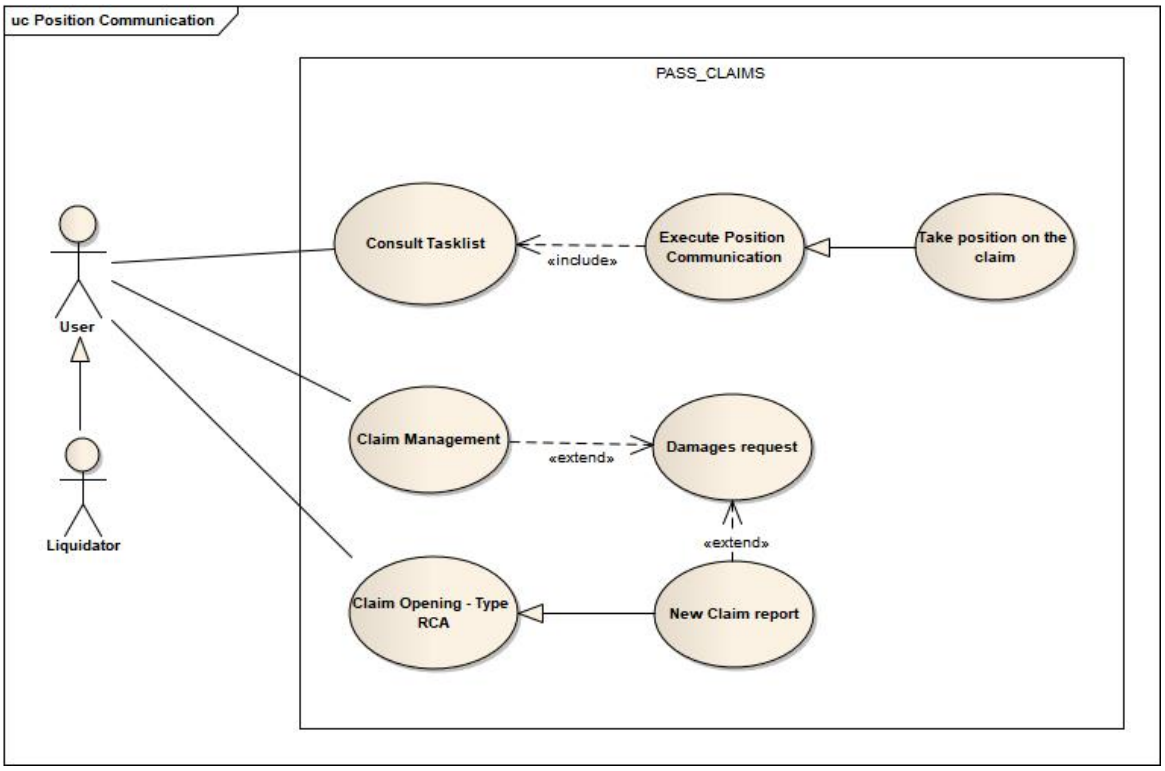


FIGURE 4.9. Use Case Diagram: Position Communication.
Figure elaborated with Enterprise Architect tool

Use Case Diagram As shown in the Figure (Use Case Diagram: Position Communication 4.9) the user takes the role of liquidator to perform the activities corresponding to the process: opening a claim of type RCA and in the specific, by performing a damages request on it. Then it would take place the declaration of the position against the claim.

Payment Deadline

The purpose of the process is to assist the liquidator in managing the payment deadlines for claims. Payment Deadlines may be conventional or they could be defined by the company, in the moment in which there has not been reported a damages request for a claim. Specifically, the support given to the liquidator user has been already done at the business process stage where it has already taken up **position** regarding to the damage, by issuing a payment receipt, which has not yet been paid. The starter event of the process is the issuance of a receipt relative to a damage causal for which a position communication process has already been initiated but has not been transformed into liquidation.

The sending of the payment receipt creates a deadline (15 days) in which the company must provide the actual payment. The process involves the possibility of reentering or returns of the

receipts issued and it enables the possibility to perform these operations at the same time or at different point on time.

The process has some possible scenarios:

1. If the acknowledgment has been accepted by the victim, the user can register their return: the system will extend the deadline of another 15 days to pay the actual payment. He may also proceed to the registration of the return and acceptance of the issue of the receipt and the actual payment at the same time, or he could proceed with the payment without registering the return of the fee.

2. If the receipt has been returned without being accepted by the victim first and the claim type is RCA NO CARD, the system determines an additional 15 days extension from the deadline date.

3. If the receipt has been returned without being accepted by the victim first and the claim type is CARD, no extension is permitted, so the company is required to make the payment no later than the 15th day after the issue has been done, independently from the fact that the receipt has been returned or not. The system notifies the user of the expiration date.

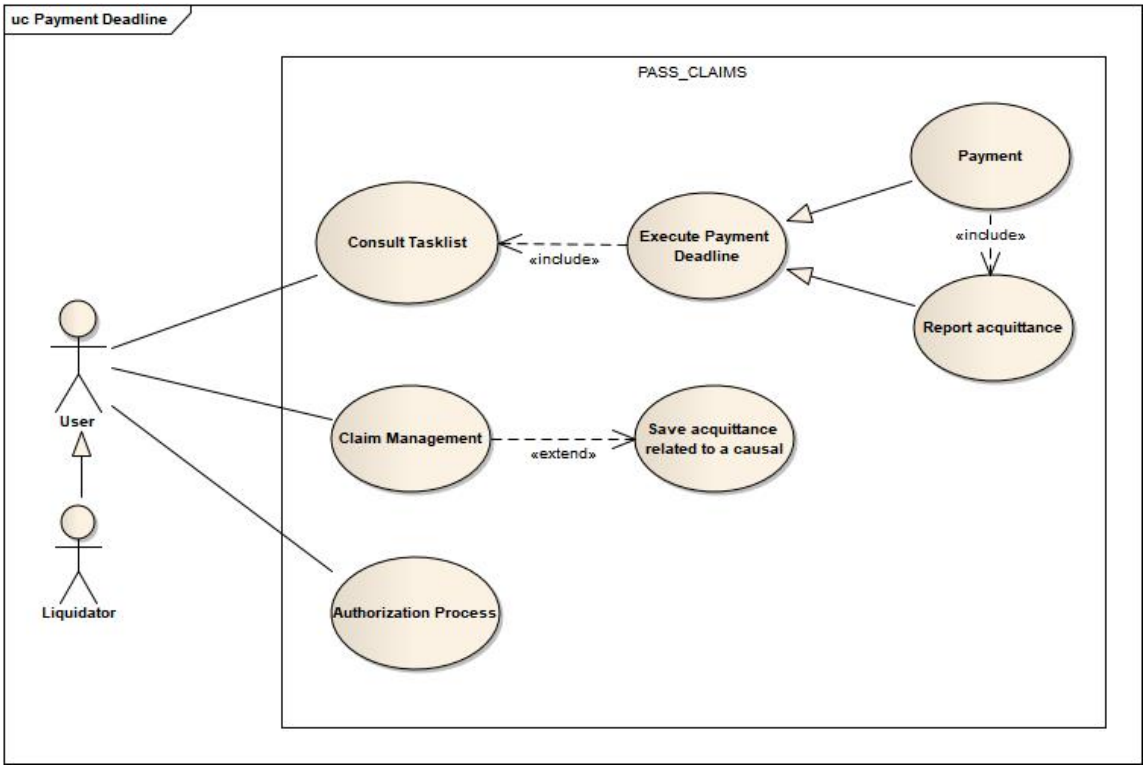


FIGURE 4.10. Use Case Diagram: Payment Deadline.
Figure elaborated with Enterprise Architect tool

Use Case Diagram As shown in the Figure (Use Case Diagram: Payment Deadline 4.10) the activities that a user can perform for the process of Payment deadline with the role of liquidator are those of saving as first step, the acquaintance of a causal for a claim, this to start the process execution and moreover, reporting the acquaintances to perform the corresponding payments. Having into account the authorization processes that have to be carried out to perform this kind of transactions.

4.5.4 Verify Claim Anti-Fraud

This process aims at allowing the company to act in compliance with the regulations and current law, preventing fraudulent actions that would result in the dispersal of economic resources or even on a prosecution. The access to the functionalities anti fraud of the system is enabled just through the login of a user and the permissions for the view, examination and management of claims reported as potentially suspicious.

At the starting point of the process, the system offers to the user the possibility to search claims that have characteristics for being suspicious, through the option anti-fraud of the workflow menu shown in the Figure (4.3). At this point the user selects one of the claims shown, the system creates an instance of the process and adds an activity in the tasklist of the group in which the user belongs, so it can be carried by any of the members. When a member decides to perform the execution of the process, then there is allowed the access to the management functionality of anti-fraud data of that claim.

The anti-fraud data management feature allows the user to carry out evaluations and operations related to the processing of a suspicious claim, such as access the Claim Data Bank of the system, liquidating it. Until the claim is considered fraudulent or if instead the claim can be eliminated from the suspicious list and handled by liquidators.

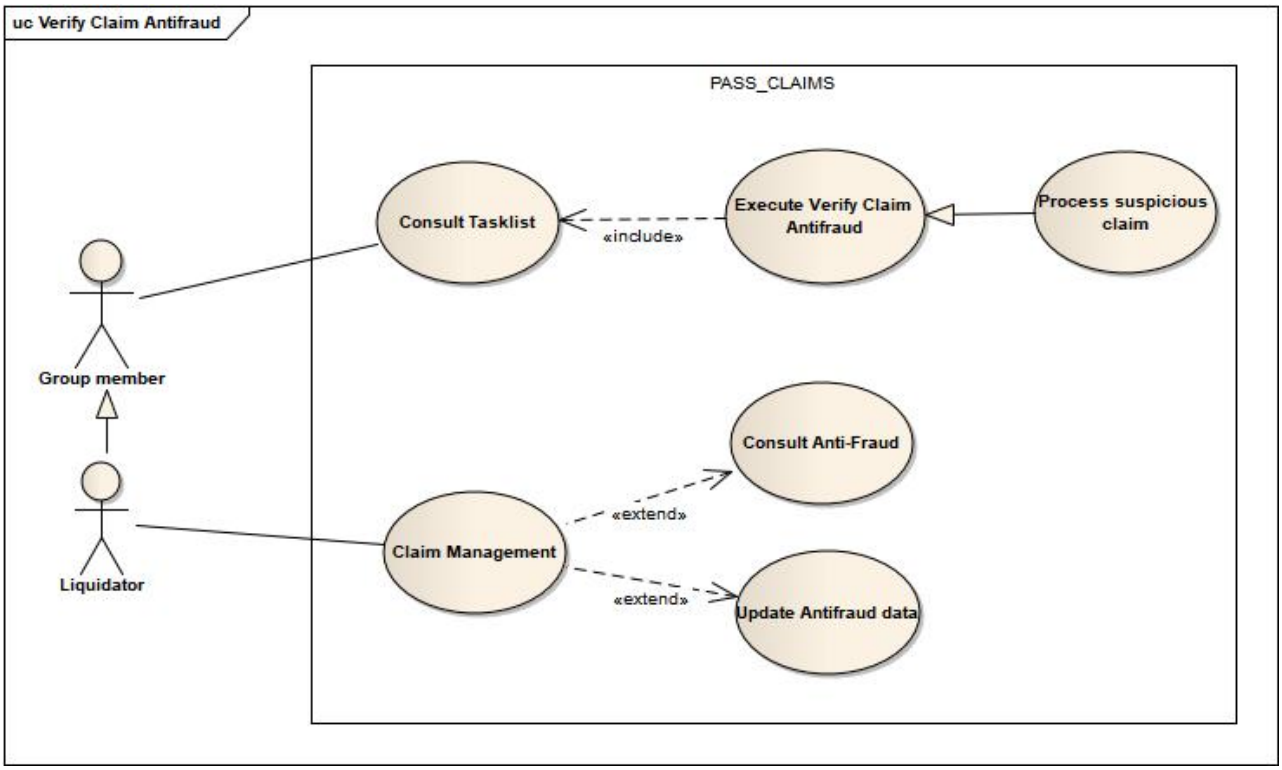


FIGURE 4.11. Use Case Diagram: Verify Claim Anti-Fraud.
Figure elaborated with Enterprise Architect tool

Use Case Diagram As shown in the Figure (Use Case Diagram: Verify Claim Anti-Fraud 4.11) the user logged with the role of liquidator is able to perform the activities related to anti fraud data such as consulting it or performing any kind of changes on it, this would start the process execution and then another liquidator with the corresponding permissions would again have the possibility to interact with the process by processing the claim and accepting or rejecting the activity requested by the initial liquidator.

4.5.5 Manual Deadline

This process assist a user to create a deadline on a claim so the liquidator to be assigned will take care of the execution of it. This gives the possibility of managing through the workflow the assignation of activities to the liquidators by the use of tasklist. This is a generic deadline that can be used by any user to attach a determined deadline to a claim and indicate the actions that have to be carried before a determined time and the priority of it inside the tasklist. If the deadlock time passes, it can be determined the actions to be carried by the system too, such as the possibility of reminder to the assignee or the possibility to create recurrent instances of the same deadline process on the tasklist of the assignee. The data objects attached to the process

contain all the information about the claim that will be shown to the liquidator at the moment of execution of the claim.

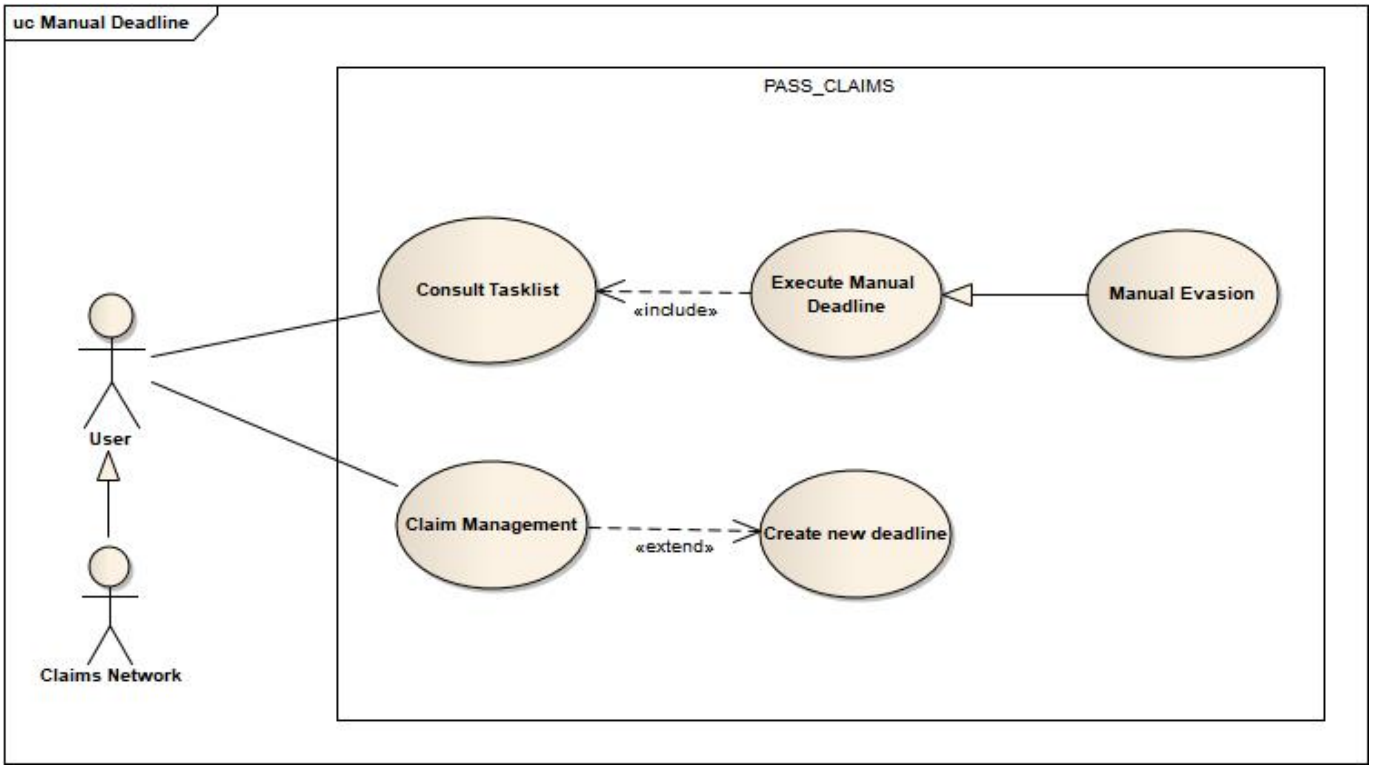


FIGURE 4.12. Use Case Diagram: Manual Deadline.
Figure elaborated with Enterprise Architect tool

Use Case Diagram As shown in the Figure (Use Case Diagram: Manual Deadline 4.12) the user is a liquidator belonging to the claims management network and can start the process by creating a new deadline through the workflow menu inside the claim management options. Moreover, the user interacts again with the process by manually evading the deadline.

4.5.6 Possibility Recovery Insured

The system enables to the user the decision to indicate whether or not to initiate a recovery action for the insured person, this applying to a claim with a liability or a debtor to which one of the following conditions applies: The insured was drunk driving or under the influence of drugs from the company's driver, the driver was not qualified for driving and vehicle not on the conditions determined by the traveling card.

Before the starting of the process, the user is required to decide whether or not to activate a claim against the company's insured. If his decision is affirmative, it is verified whether there

is already a reimbursement for the same taxable person in the system. If it is successful, the process starts and an activity is created in the tasklist of the liquidator, where it will be possible to perform the completion of data and when this operation is done, the process finishes.

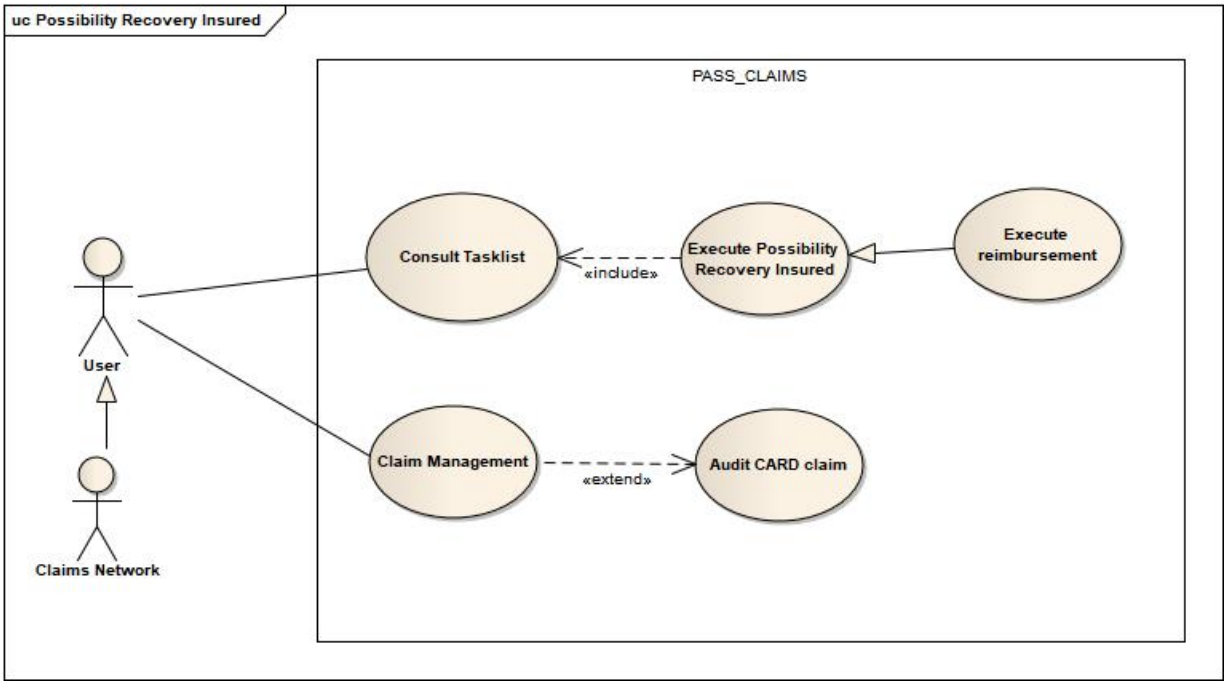


FIGURE 4.13. Use Case Diagram: Possibility Recovery Insured.
Figure elaborated with Enterprise Architect tool

Use Case Diagram As shown in the Figure (Use Case Diagram: Possibility Recovery Insured 4.13) the user is a liquidator belonging to the claim management network whom performs the audit of a claim belonging to the CARD branch, at this point the process starts its execution and then through the tasklist, the liquidator can deny or concede the reimbursement of the claim to the insured participant of the claim by setting it in the claim data.

4.5.7 Report Potential Claim

The process start action is a batch activity saving event of one of the two following:

1. A new claim debtor for which there is no incident of claim or practice already in the system with the same identifier (a set of five identifier numbers: the two plates of vehicles, the two names that identified the insurance companies of the two parts and the date of occurrence of the claim).

2. The occurrence of a claim for which there has not been presented a report from the insured.

At this point, it is expected that the agency will be notified by sending an automatic mail to recover the insured's complaint within 28 days from the moment of arrival of the claim, with the declaration of responsibility made by the insured or with the event negation (NE) or non-applicability (NA). The agency/broker, in response to the recovery of the claim of its insured, may proceed with the debtor flow response, upon the expiration of the 28th day the system does not automatically fill in the answer with Missing Complaint but deletes the deadline while maintaining the process active.

In the event in which the process is started by a non-ratifying party and has no access tot he information of the claim, with the exception of the data about the responsibility. Then the recovery of the claim is executed:

- If after 5 days, the insured party has not been included in the complaint or claim for damages and the reclamation activity is charged to an agency user, a letter is automatically sent to the insured party

- If after 18 days, no damages or report have been filed by the insured contractor, a reminder is automatically sent to the agency/broker (mid-term)

- If after 25 days, no damages or damages have been filed by the insured party, a registered letter is sent to the policyholder

- In the event of a declared statement of liability equal to NE / NA: it is required to upload the related documentation. In case the broker/agency does not execute the manual activity on its tasklist, by expiration date and the signature type is one, the response must be MD (Missing Complaint) and it is automatically sent.

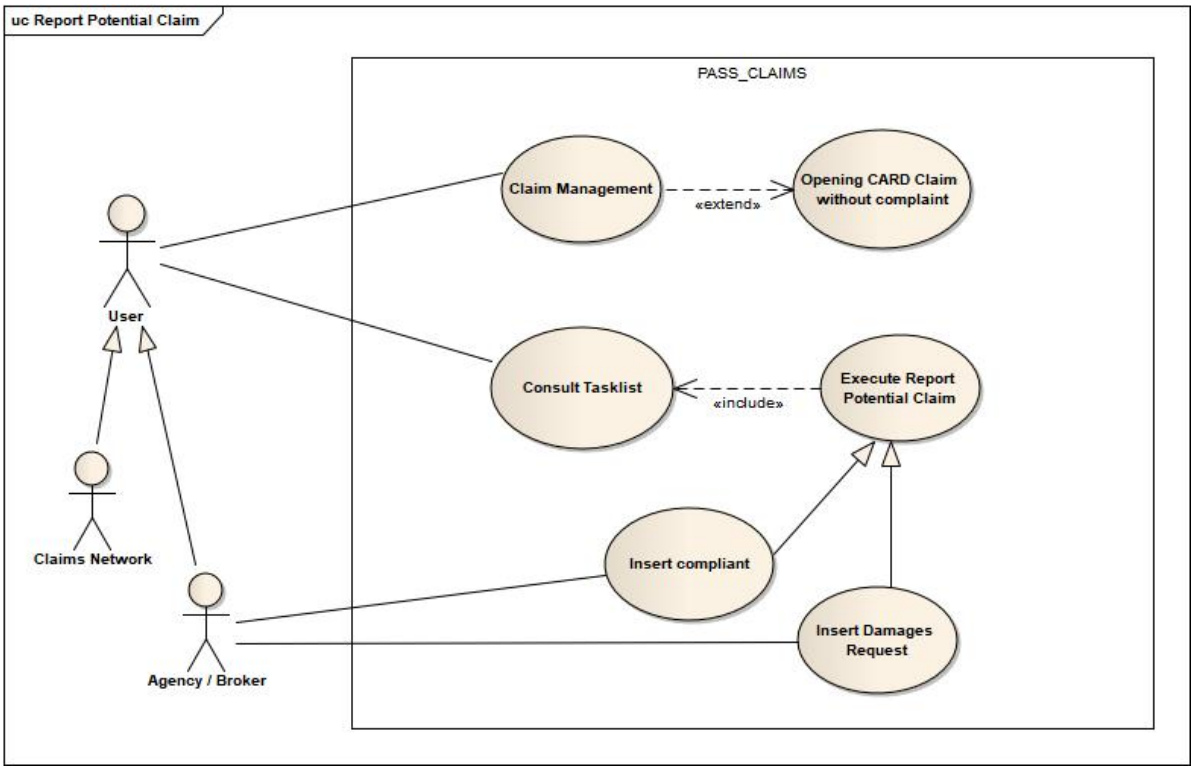


FIGURE 4.14. Use Case Diagram: Report Potential Claim.
Figure elaborated with Enterprise Architect tool

As shown in the Figure (Use Case Diagram: Report Potential Claim 4.14) the process starts when a user with the role of liquidator inside the claim management network or from an agency/broker performs the opening of a CARD claim that does not have reported any complaint. At this point the user with the role of agency/broker finds inside its tasklist the activity for executing the report until either inserting a damage request or the missing complaint of the claim.

4.5.8 Discordant Responsibility Deadline

The process is triggered by a batch activity, with definite liability for discordant statements, the liquidator user finds an instance of the process in his workflow tasklist, when the execution is carried out the user is required to choose one of the following options: Accept the responsibility and send payments with the corporate responsibility, open arbitration and correct the responsibility by adjusting it to what the counterparty defines. If arbitration is decided, there is created another instance of the process in the tasklist so the user can either confirm the opening of the arbitration, reject the request (in both cases the process ends) or request additional documentation from the liquidator.

In the event that no position is reached by the date of the highest arbitration request, it is consider the implicit acceptance of the competition. The update of the liability declared as defined automatically triggers the automatic payments with the new liability and consequent expiry of the 50% bail.

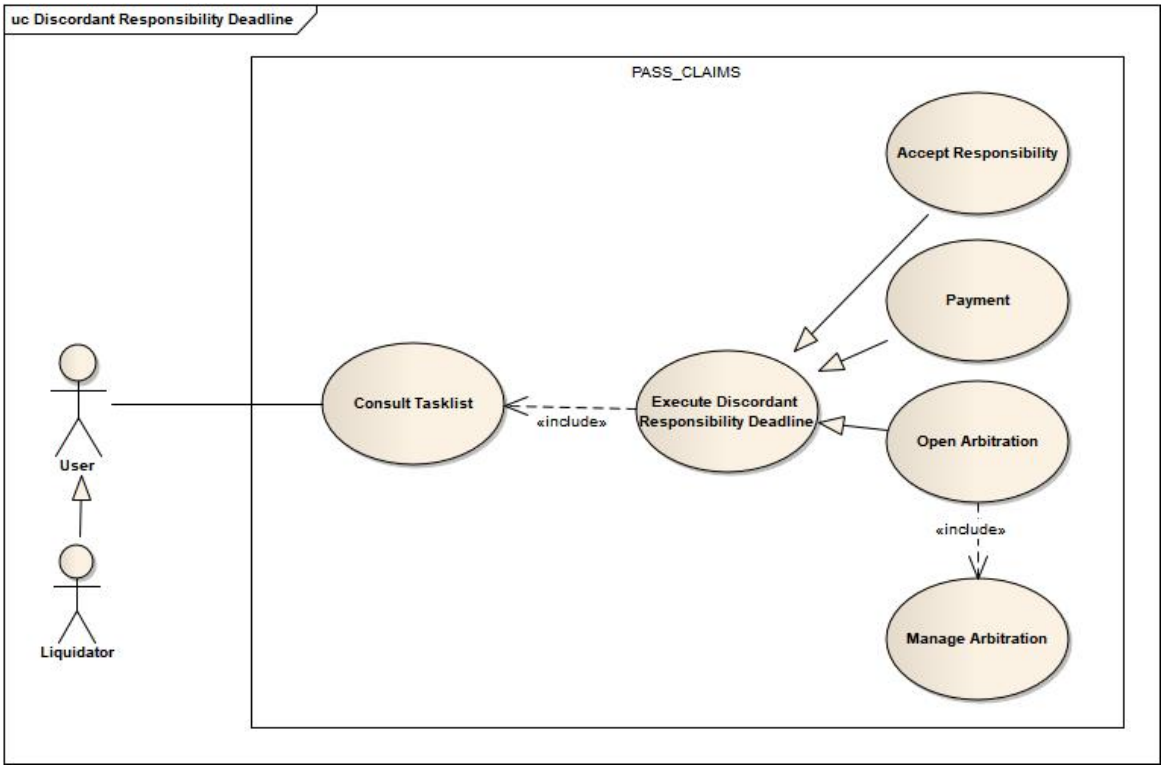


FIGURE 4.15. Use Case Diagram: Discordant Responsibility Deadline.
Figure elaborated with Enterprise Architect tool

As shown in the Figure (Use Case Diagram: Discordant Responsibility Deadline 4.15), the user is a liquidator able to interact with the process just when it has been already instanced (by a batch activity). It can perform the activities of payment, accepting responsibility on the claim and open and managing arbitration.

Chapter 5

As Is: JBPM

This chapter is intended to illustrate the BPM engine used by the company for many years, this is to open up the discussion of the ***AS-IS situation*** of RGI Group before the migration plan execution (situation later analyzed inside the Migration dedicated chapter (7)). First of all, it is presented the concept of JBPM JPDL (5.1) as the business process management tool, from which the core engine is used. Moreover, it is also presented the Autore RGI (5.3) which takes the role of modeler for the design and definition of the workflow processes of the company.

5.1 JBPM JPDL

"JBPM is a flexible Business Process Management suite, an extensible framework and workflow process engine written in pure java and fully open source, distributed under Apache license." [13] It has been used by RGI company for many years and it will continue to work inside the company for a period of time after the migration plan is completed, this is to assure the retro-compatibility to the company's clients that are still using it and also, after all of the products have incorporated it. It is able to execute business processes which are designed with BPMN 2.0 standard and also monitor them, enables the management of process definitions and the possibility to inspect and manipulate runtime instances.

The framework is composed by three main components, it has only one mandatory component called ***Core Engine***, followed by two optional components which are: an Eclipse-based or web-based designer and a Management console. The core component can be embedded as part of the company's application or deployed as a service.

RGI makes use of just the Core Engine of JBPM given that the company already had instances that could replace the two other components. These are, the logic and presentation of the web application for the management of tasks inside the task-lists of users and groups; described inside the section: Processes on PASS_CLAIMS (4.3.5) of chapter dedicated to RGI Group, and the RGI Autore (5.3) which has been implement by RGI for the design and modelling of processes.

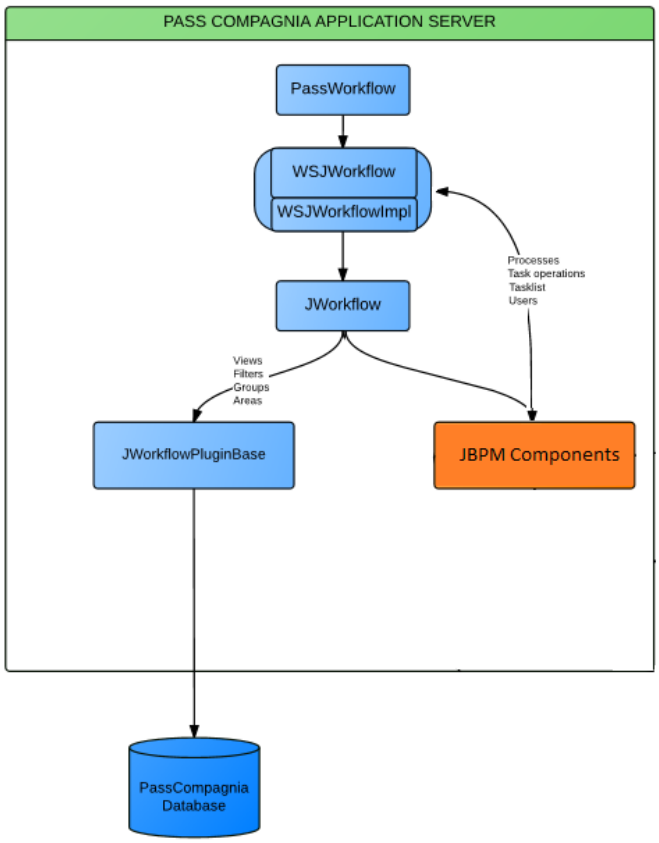


FIGURE 5.1. Pass Before Camunda.
Figure reproduced from RGI internal documentation.

The company uses Jboss Wildfly as application server and **the Core Engine of JBPM is located inside it**, as shown in the Figure (5.1). This provides usability to the system given that there is just one application server to put on with all the functionalities of the BPM already available. However, when performing migration activities it results a little harder to separate the components in comparison of having the BPM in a separate application server. The system as is, requires for the migration, the activity of going into each of the bpm-correlated classes to be able to perform the migration.

As seeing in the Figure (5.1), the application server holds all the logic related to the components of PASS, these are the blue boxes. Moreover, the orange box represents the core engine of JBPM which holds all the logic related to BPM and therefore related to the workflow so all the information related to processes, task, groups, users and the relationship between them.

5.2 Main characteristics

The following list, describes the engine JBPM used by the company in the AS IS situation: [13]

- The Core Component is the heart of the implementation, allows the system to execute business processes in a flexible manner. It is a plain java library (J2SE) and as therefore it can be used in any java environment, as well as embed as part of the application.

- For the persistence, jBPM uses *hibernate* library internally. Apart from traditional mapping, hibernate also resolves the SQL dialect differences between the different databases, which makes jBPM portable across all current databases.

- The API can be accessed from any custom java software, like web applications, EJB's, web service components, driven beans or any other java component.

- jBPM supports two XML based process languages: JPDL and BPEL. JPDL, the one used by RGI, is a flexible process language that ties process definitions to the Java Plain Old Java Objects (POJOs).

- The Process Definition Language (JPDL) specifies an xml schema and the mechanism to package all the process definition related files into a process archive. The process definition is a zip file containing this xml file and can also contain other process related files such as classes or ui-forms for manual tasks.

5.3 Autore RGI

The company has developed a BPMN Modeler, called Autore RGI, with the purpose of designing and putting together the processes that run over jbpm, the BPMN models that are created with the Autore are used to relate the process definition with the flow of information that it represents as the standard BPMN (3.2.1) requires. Therefore, it links each activity inside the process definition with its correspondent implementation. As BPM concept aims, these designs help the company also in the way that they are more understandable definitions of processes and, consequently they allow managers and decision-makers to see processes also in a non-technical way, at the same time programmers put together all components of the logic and the design inside a processes so it can work correctly and enable a graphical understanding of it.

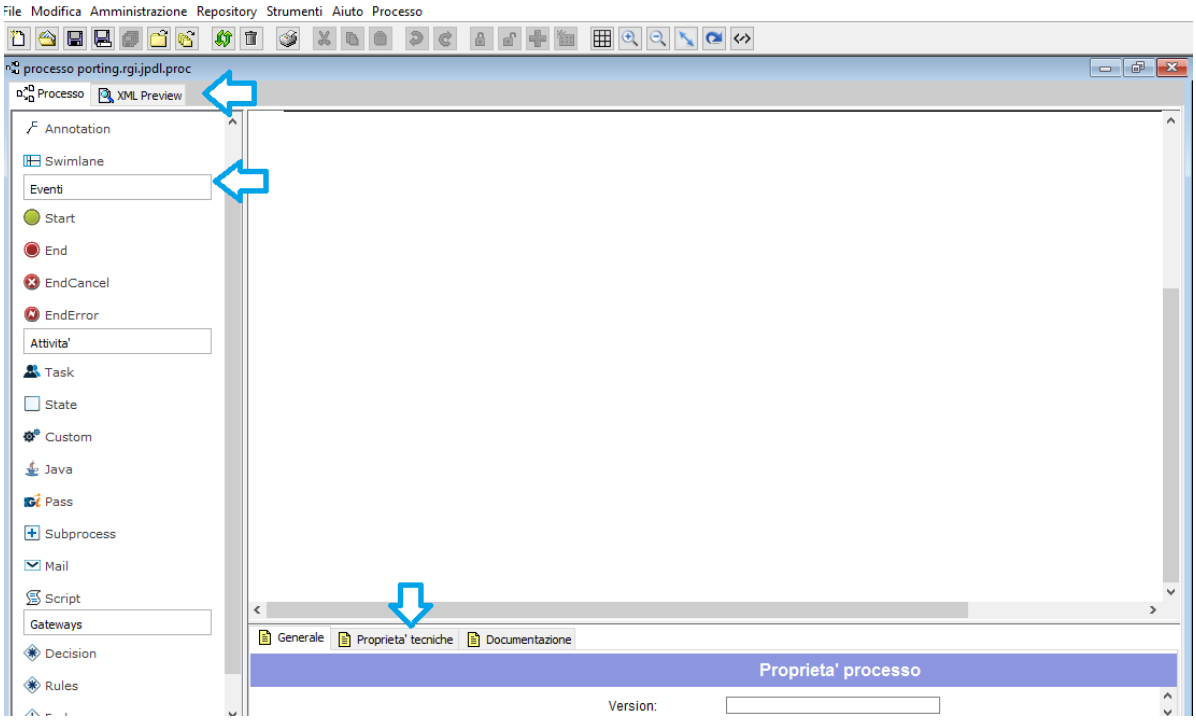


FIGURE 5.2. JBPM Autore RGI.
Figure elaborated with Autore RGI

The application follows the design and structure illustrated in the Figure (5.2), it is available only in Italian language and as shown, it is build in a graphic way and therefore it is also visually friendly. It could be subdivided into: components and properties.

The user can select the components located to the left side of the application and place them in the center of it, this is to build the design of a given process. The configuration of a process and therefore, of each of its components appear as soon as a component is selected and it allows the user to edit each field. While the design of the process goes on, developers also have the possibility of accessing to the XML code generated however, this XML file just gives permissions of reading and it is not possible to edit the components by means of coding.

5.3.1 Components

The following table (5.1) illustrates each component inside the Autore. In the left side of the table, it is presented the name and the design of the single component, related with a description in the right side. These components conform just a subset of the ones described in the BPMN 2.0 Standard, there have been developed within the application just the main and more important ones, with respect with the process definition that the company RGI follows. These components are theoretically divided into three types, these are: Events, Gateways and Tasks, shown in this

order inside the table (5.1).

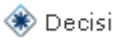
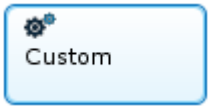
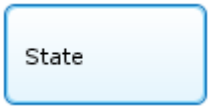
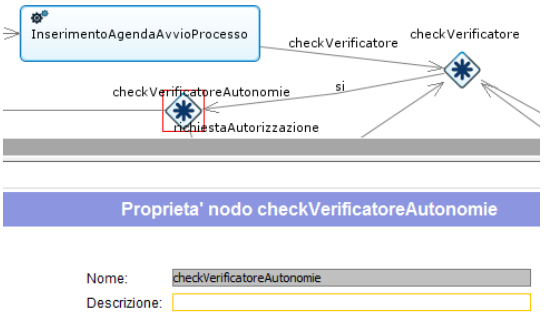
Element	Description
	Starting point of a process. This is a none event, which means that the modeler does not specify the exact event that triggers the process, it is started from an external point that is not relevant within the definition.
	End point of a process definition. This is a non event, which means that the result thrown when the process finishes is unspecified and not relevant.
	The process is divided into parallel branches. It is used to model concurrency within the process, at this point all outgoing sequence flows are followed in parallel.
	The set of branches which have been separated previously by a Fork, is grouped together again when each of them comes into an end and the process continues with a single flow of execution.
	Models a decision within the process, when the execution arrives to this point a condition is evaluated and only one sequence flow is selected to continue the process execution.
	It is a manual task used to model work that needs to be done by a human actor. When the process execution arrives here, a new instance of the process is created in the task list of the user or group assigned to that task.
	Automatic task that uses an automated application or web service to complete the task. An RGI java class is named inside the task and it is executed when the process arrives to this point.
	Waiting status in which the process is suspended until an internal or external event ends it.
	Waiting status in which the process is suspended until the timer attached is expired.
	Task containing a communication activity. At this point the process is relying on an incoming message or until an specific message has been sent.
	References a point within a process execution in which another process is executed. The main process instance waits until the sub-process is completely ended, and continues the original process afterwards.

Table 5.1: RGI Autore modeler Components.

5.3.2 properties

Depending on the type of components, the properties enabled in the application to be configured, are shown to the user. As pictured in the Figure (5.2) the properties are shown in the lower part

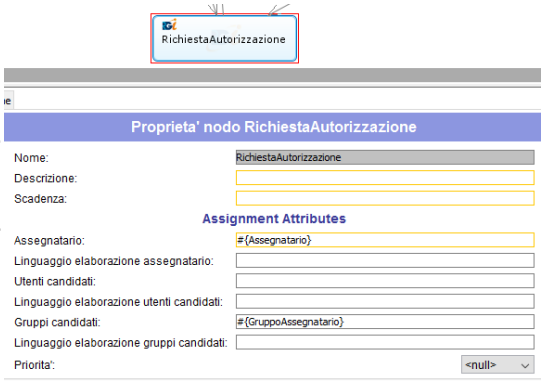
of the screen and they are divided into three tabs: general properties, technical properties and documentation.



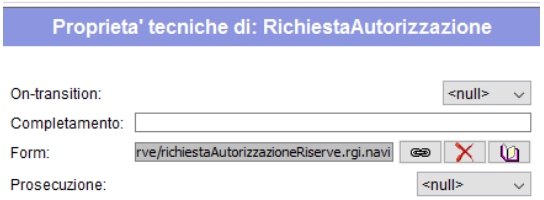
Autore General Properties v1
Figure elaborated with Autore RGI

The *General* tab shares the same structure for the evens, gateways and automatic tasks. This is as shown in the figure to the left where there are two basic fields, just the name and a short description.

On the other hand, the *General* tab for the manual activities is is as shown in the figure to the right, it contains the fields to configure important aspects about the implementation such as the deadline of the activity, the person to whom it will be add in the task list and the priority level.



Autore General Properties v2
Figure elaborated with Autore RGI



Autore Technical Properties
Figure elaborated with Autore RGI

The *technical* properties tab, as shown in the figure to the left, contains the fields necessary to link the bpm component to its implementation by inserting the path to the corresponding class file.

At last, the properties tab corresponding to the documentation is just a free text field where the user can write what it is considered relevant for the design.

Chapter 6

To Be: Camunda BPM

During this chapter it is presented the Camunda BPMN tool which opens up the discussion of the ***TO-BE situation*** of RGI Group workflow processes, their implementation and management (later analyzed in detail inside the Migration chapter (7)). There are presented the main characteristics of the Camunda system, there is shown an overview of camunda as a company and of the software product that it offers (6.1). Then, getting more in detail it is described the core engine of the platform (6.2) and some other features that make camunda an easy blank for companies as RGI which are looking for change and innovation for automation of business processes; these are the Camunda modeler (6.3) and Cockpit BPM (6.4).

6.1 Overview

Camunda is an open source platform for workflow and business process automation, it can be used to define and execute business processes in BPMN 2.0 (3.2.1) and also gives support for CMMN 1.1 (Case Management Model and Notation) and DMN 1.1 (Decision Model and Notation), these last two however, are not implemented by RGI in the migration plan that is being analyzed within this document.

As organization, Camunda has based out in Berlin, Germany. It was founded in March 2008 and currently employs around 30 full time employees. It has been focusing on the topic of Business Process Management since day one and also participated in defining the BPMN 2.0 standard [3]. After four years of focused consulting on BPM, in 2012 they decided to offer their own BPM software product. The extraordinary success has led to defining Camunda BPM primarily as a software vendor. In spring 2014 Camunda Inc. was founded, based in San Francisco, California. Since then, it has successfully been developing quality software [3].

The suite is conform of several components that make camunda outstand in comparison with its competitors and this is because apart of the general features, camunda offers new ideas and it is placed ahead with respect with the updates that the market aims for. The Figure *Camunda architecture* (6.1) shows the components along with some typical user roles. The two

most important components of the platform are the core engine and the modeler. followed by the cockpit, tasklist and optimize. All these are looked up in detail ahead during this section.

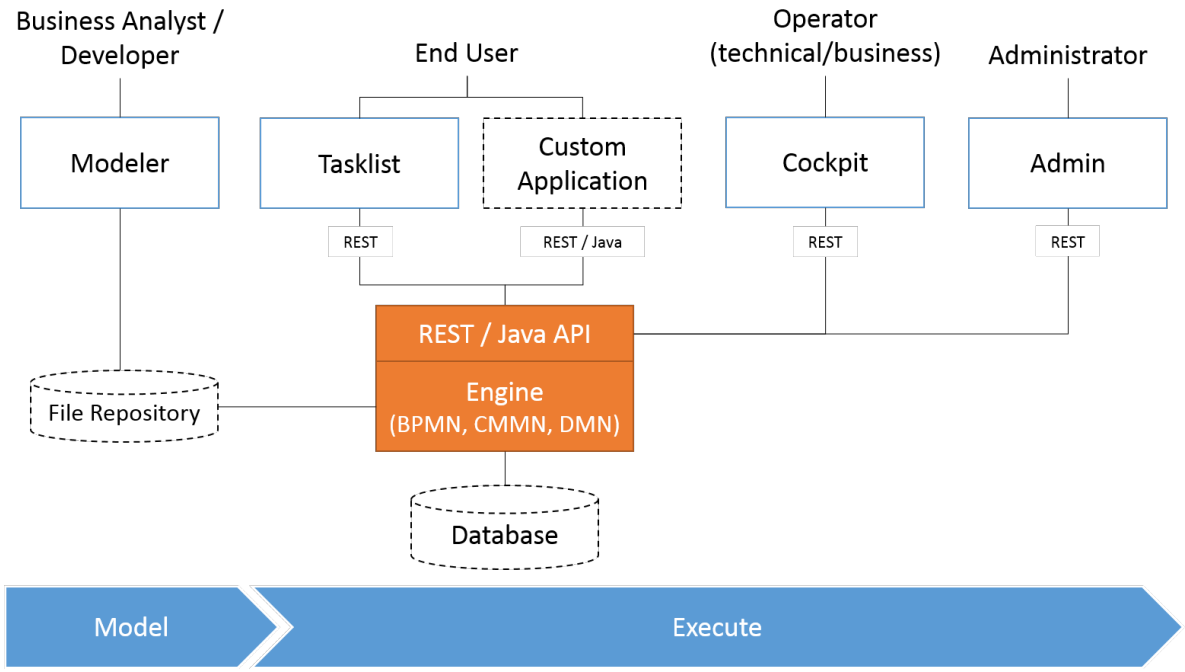


FIGURE 6.1. Camunda architecture.
Figure reproduced from [4]

6.2 Core engine

As shown in the Figure (6.1) as the central element, drawn with orange color, the Core Engine represents the central point inside the Camunda architecture. It is lightweight and requires less than 3MB of disk space. It can run in any Java Virtual Machine (JVM) and comes with extended integration for different runtime containers, is a Java library that executes BPMN 2.0 processes, has a lightweight POJO core and uses a relational database for persistence [4].

All other components of Camunda for model, administer and execute, communicate with the core by means the REST API, or via the Java API and use existing integrations with Spring and Java EE. RGI company can also decide to implement its own additional components (Task-list or Admin), and not necessary the ones offered by camunda, that can also make use of the core engine's public Java API.

6.3 Camunda Modeler

It is a desktop application developed by Camunda for the modelling of the workflow processes, follows the BPMN 2.0 standard and it is easy to use, therefore it allows also analyst to access the processes' diagrams in the same way developers work on them. The modeler enables the possibility to edit all properties that are necessary for the technical execution.

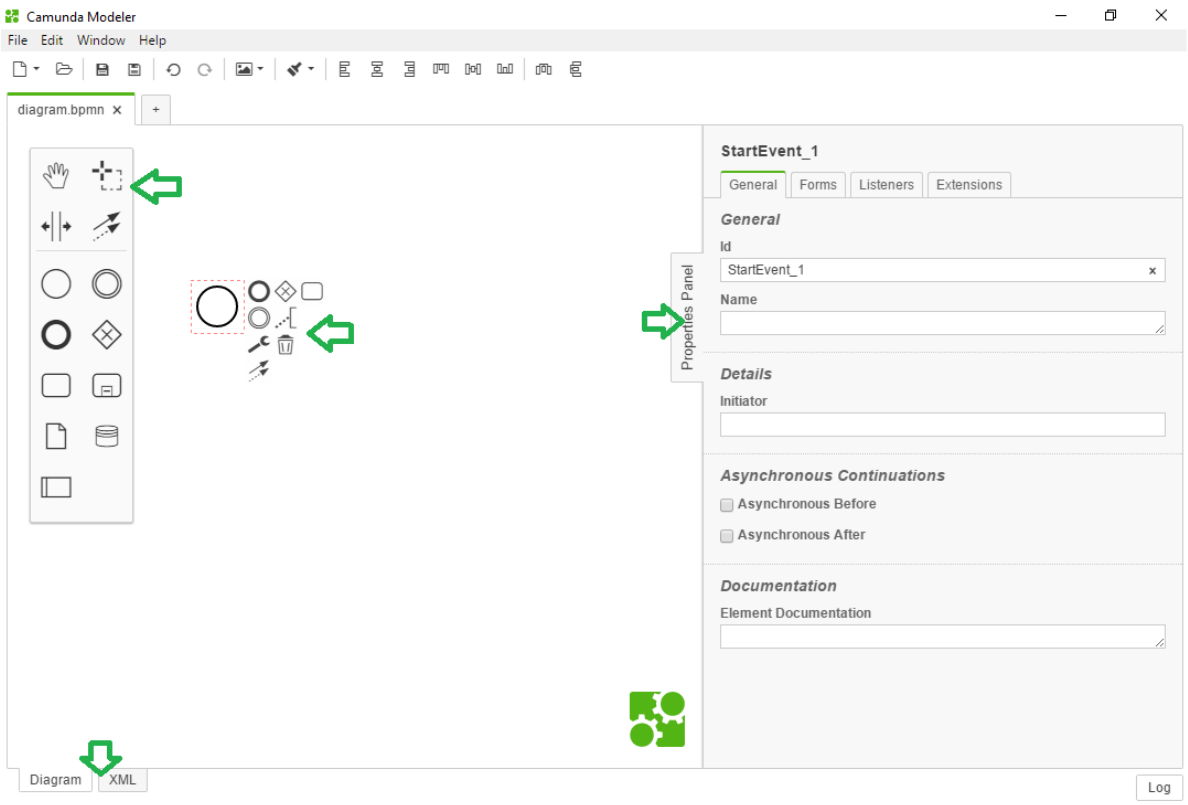


FIGURE 6.2. Camunda Modeler.
Figure elaborated with Camunda Modeler

The modeler has the structure that is being shown in the Figure (6.2), the application is visually friendly and allows the user to drag and place the components (6.3.1) from the tools panel inside the diagram of a process as well as configure them with the properties panel (6.3.2), located at the right side of the process design, it enables also the possibility of defining the process by means of an XML file corresponding to the design which is dedicated to the developers (shown in the lower left part of the Figure).

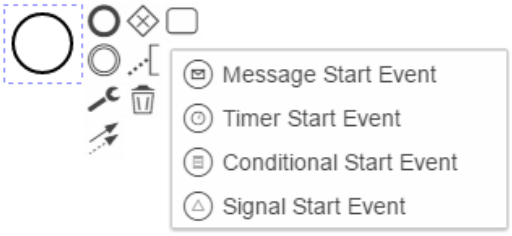
6.3.1 Modeler Components

The components of the Camunda Modeler follow the standard BPMN 2.0, explained before during this dissertation, in the BPM chapter (3). These components are explained during this subsection and they are divided in the three big categories, these are: Events (6.3.1.1), Tasks (6.3.1.2) and Gateways (6.3.1.3).

6.3.1.1 Events

The events in the Camunda modeler can be divided into three types, these are: Start, Intermediate and End events. This type of elements represents something that occurs during the curse of a process. The following definitions have had as source of investigation the Camunda BPM 2.0 documentation and manual. [4]

Start Events



Camunda Start Events.
Figure elaborated with Camunda Modeler[4]

It is the type of event that triggers a new instance of a process. It can indicate where and why a process is started. If the type of start event is not specified, then it is considered a ***NONE*** start event, which just triggers the process without having additional information, it is also called *"Blank Event"*. Graphically, the none event is just an empty circle at the beginning of the process. Instead, if a start event has type defined, corresponding to one of the types listed in the Figure Camunda Start Events (6.3.1.1) it considers some additional information for the moment in which the process instance is triggered. These could be timer, signal, message and conditional.

The ***MESSAGE*** start event, triggers the process instance by receiving a message from a Pool. Graphically, the message start event contains a thin envelope inside it. The ***TIMER*** starts the process in a specific Date-Time or a specific Cycle (e.g. every Friday). Graphically, the Timer start event contains a thin clock inside it. In the ***CONDITIONAL*** type of start event, the trigger is a conditional expression that must be met by the process to begin with its execution. These conditions, typically imply changes to the values of the relevant data for the process. At last, the ***SIGNAL*** trigger starts the process when a signal which has been broadcasted from another process, arrives. A signal start event is different from message in the way that it does not have an

specific target, is broadcast and it can be used inside the process and not just pools. Graphically, the Signal start event contains non-filled triangle inside it.

End Events

Camunda End Events.
Figure elaborated with Camunda Modeler[4]

As the opposite of start event, the end event indicates where a process will end, this means that this typology of events describes which is the action or result that is thrown by the process after finishing its execution. If the type of the end event is not specified, then it is considered a ***NONE*** event, which only marks an standard end of a process, this means that the result thrown when the event is reached is unspecified.

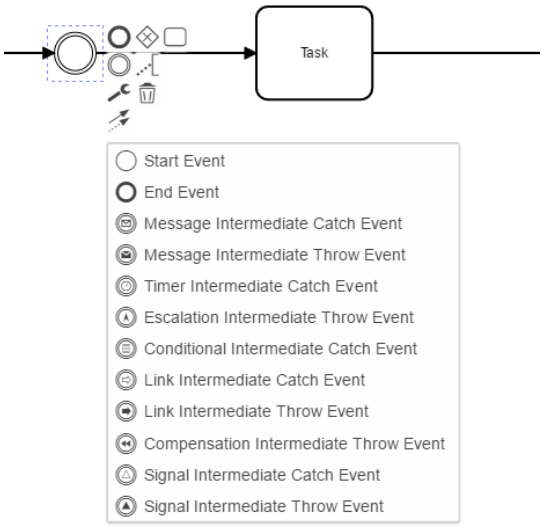
Graphically, the end none event is really similar to the Start none event, with the difference that its border is in bold. Moreover, if the end event is specified, it can be one of the types listed in the Figure Camunda End Events (6.3.1.1) these types determine the action that must occur when the process ends, these can be: message, escalation, error, compensation, signal or terminate.

When process execution arrives at a ***MESSAGE*** end event, the current path of execution is ended and a message is sent to a participant/pool. From this perspective, this event has the same behavior as a Service Task given that it uses a delegation class to perform the activity. Graphically, the message End event contains a bold envelope inside it. ***ESCALATION*** determines the ending of a path of execution and after it, an escalation is thrown. It has the same behaviour of an intermediate escalation event and unlike an error, it is non critical, which means that the execution continues at the location of throwing. They are mostly used to communicate from a subprocess to an upper process. Graphically, the escalation End event contains a bold arrow inside it. ***ERROR*** end events are event definitions which when arriving to the end of the current path of execution, throw a named error. This type of event, is caught by a matching intermediate boundary event and then the execution continues, if no matching event is defined then it follows a none end event. Graphically, the Error End event contains a bold lighting bolt inside it. [4]. Moreover, the ***COMPENSATION*** end events triggers a compensation as a final action on a process, this meaning that, it goes back by undoing some previous steps, it is used to set the behaviour required when a transaction subprocess is cancelled or has to be undone (rollback). Graphically, the Compensation end event contains two bold arrows pointing backwards, inside it. The ***SIGNAL*** end event throws a defined signal (One signal thrown can be caught

multiple times) and the current path of execution is ended. It has the same behavior as a signal intermediate throwing event. Graphically, the Signal end event contains a bold triangle inside it. At last, the ***TERMINATE*** type of end event describes an additional definition element to mark the termination of a process, this result indicates that all activities in the process should be immediately ended, it is useful when there are parallel split flows inside the process instance and so in this way all tokens that are currently available are consumed immediately. On a process instance level, the whole process is terminated, instead, on a subprocess level the current scope and all inner processes will be terminated. Graphically, the Terminate end event contains a bold circle inside it.

Intermediate Events

These type of events model the situation in which something occurs in between the start and the end event of a process. They can be used within the process definition to show where messages are received or sent, show the necessary delay, perform exception handling and show the need of compensation, they can be placed in two places: Attaching them to a boundary of task/sub-process and on the normal flow of execution (i.e. connected from a flow without attaching to an activity). If the type of the intermediate event is not specified then it is considered to be a ***NONE*** event, designed as a double blank circle in the Camunda Modeler. This type of intermediate event does not have a defined trigger and so it is used just to indicate a change of state within the process and so it can be placed only on the normal flow but not as a boundary event of a task. If the intermediate event has a different type, it can be one listed inside the figures: Camunda Intermediate Non-Boundary Events (6.3.1.1) and Camunda Intermediate Boundary Events (6.3.1.1). These can be the following, subdivided in boundary and non-boundary types.

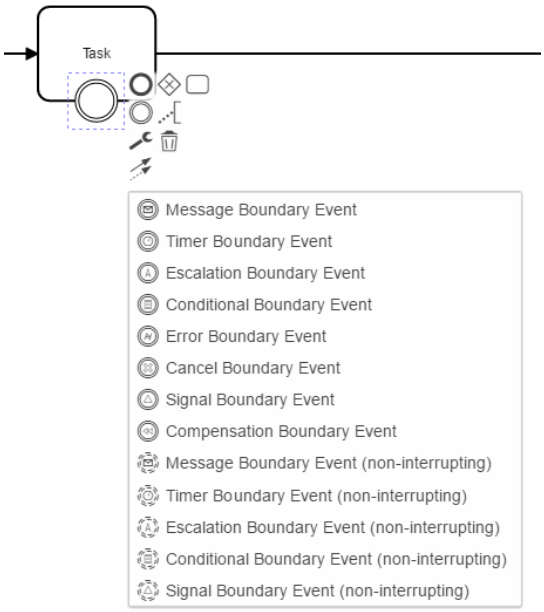


Camunda Intermediate Non-Boundary Events. Figure elaborated with Camunda Modeler[4]

Non-Boundary:

This type of intermediate non-boundary evens are located inside the process in the middle of a normal flow of execution. As shown in the figure to the left, Camunda Intermediate Non-Boundary Events (6.3.1.1). These are the following:

MESSAGE (CATCH) describe the situation in which the process reacts to the arrival of a message. Here the flow of execution of a process instance is stopped until the message is received. Graphically, the Message Catch event is a double circle with a non-filled envelope in the middle. ***MESSAGE (THROW)*** type sends a message to a communication service and afterwards, the process continues with its normal execution. This type of intermediate event can have the same behavior as a service task. ***TIMER*** is a point inside the process that behave itself as a stopwatch. When an execution arrives in catching event activity, a timer is started and when this timer fires (e.g. after a specified interval or at a specific date), the sequence flow going out of the Timer intermediate event, is followed. Graphically it is a double circle with a clock in the middle. ***ESCALATION*** describes the moment in which the process execution throws a named escalation which in turn can be caught by an escalation boundary event or an event sub-process with an escalation start event which has the same code or has a none escalation event. Graphically, it is a double circle with a bold arrow inside it. ***CONDITIONAL*** type of event is a type a wait state which stops the process execution until the condition defined inside it is true. When the execution arrives at the catching event activity, the condition is evaluated for the first time. If the condition is satisfied, the execution process continues to the next activity. If the condition is not satisfied, the execution stays in this activity until the condition is satisfied. ***LINK*** works as a Go-To to another point in the same process model in which another link event (Catch) is located. ***COMPENSATION*** is used in case of partially failed operations, to go back on the execution of previous steps within the process. And ***SIGNAL*** intermediate events help to communicate within activities, process levels and pools; when a condition on the process is reached. when waiting for a signal, the process execution is delayed.



Camunda Intermediate Boundary Events. Figure elaborated with Camunda Modeler[4]

Boundary:

This type of intermediate events are attached to an activity within the process, in this way the normal process flow of execution can be altered depending if it is an **Interrupting** or **Non-Interrupting** event. The interrupting boundary events cancel the instance of the activity to which the event is attached and the flow of execution continues just for the outcome of the event. Instead, the Non-Interrupting allow the process to continue both of the flows within the process execution. Additionally, regarding the graphic representation, the non interrupting ones are surrounded by an additional dotted circle. The Figure (6.3.1.1) illustrates the boundary events, these are the following:

The ***ERROR*** boundary event is in charge of catching errors that are thrown within the scope of the activity or subprocess on which it is attached to. Graphically, it contains an empty bolt. When the ***CANCEL*** boundary event is triggered, it interrupts all executions active in the current scope and then starts compensation actions on it. When using ***MESSAGE*** boundary events act like catching events, this means that while the activity is running, it is listening for message and when it is caught, and depending on the configuration of the event (interrupting or not) the sequence going out of the event is followed. ***TIMER*** acts as a stopwatch on the activity to related to it, when the execution arrives to that activity, the timer is started and when it fires, the sequence flow going out of the event are followed. graphically it has a clock inside and it can be surrounded by the dotted circle or not depending on its definition. A ***CONDITIONAL*** boundary event is like an observer, this means that it is triggered if a specific condition is satisfied . At last, there is the ***SIGNAL*** event which, as defined for the non boundary type of events, allows communication between process levels. When the execution of the process arrives to the activity to which the signal boundary event is attached, the signal boundary event is in charge of catching a specific signal.

6.3.1.2 Tasks

The following table contains the types of activities considered in camunda and at the same time part of the standard BPMN 2.0.

Element	Description
	Starting point of a process. This is a none event, which means that the modeler does not specify the exact event that triggers the process, it is started from an external point that is not relevant within the definition.
	End point of a process definition. This is a non event, which means that the result thrown when the process finishes is unspecified and not relevant.
	The process is divided into parallel branches. It is used to model concurrency within the process, at this point all outgoing sequence flows are followed in parallel.
	The set of branches which have been separated previously by a Fork, is grouped together again when each of them comes into an end and the process continues with a single flow of execution.
	Models a decision within the process, when the execution arrives to this point a condition is evaluated and only one sequence flow is selected to continue the process execution.
	It is a manual task used to model work that needs to be done by a human actor. When the process execution arrives here, a new instance of the process is created in the task list of the user or group assigned to that task.
	Automatic task that uses an automated application or web service to complete the task. An RGI java class is named inside the task and it is executed when the process arrives to this point.
	Waiting status in which the process is suspended until the timer attached is expired.
Subprocess	*see following paragraph: Subprocess*.

Table 6.1: Camunda Modeler Tasks.

Sub-process

Automatic task that uses an automated application or web service to complete the task.

An RGI java class is named inside the task and it is executed when the process arrives to this point. Automatic task that uses an automated application or web service to complete the

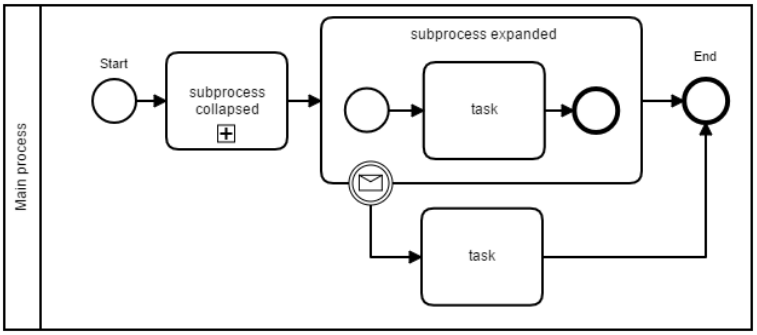


FIGURE 6.3. Sub Process.
Figure elaborated with Camunda Modeler

6.3.1.3 Gateways

Gateway type	Description
 Exclusive Gateway	Considers the decisions within a process instance, based on a given data to determine sequence flows Model decisions based on data. When the execution arrives at this point, all outgoing sequence flow conditions are evaluated (in the order in which they are defined) and the flow with the condition true is selected to continue the execution.
 Parallel Gateway	It is used to model concurrency in a process enabling the forking and joining of multiple paths of execution, this means that when this gateway is used for splitting the sequence flow, all outgoing branches are activated simultaneously. Instead, when merging parallel branches it waits for all incoming branches to complete, before it triggers the outgoing flow.
 Inclusive Gateway	Models a conditional fork-join concurrency, this means that it can be seen as a combination of both exclusive and parallel gateways: as exclusive because it is possible to define conditions for the outgoing flow; and parallel because it can receive more that one sequence flow to provide concurrency.
 Event-based Gateway	Enables to make a decision based on events, in this way each outgoing sequence flow of the gateway needs to be connected to an intermediate catching event and when the flow of execution arrives, this kink of gateway acts as a wait state, until one of the attached events occurs.

Table 6.2: Camunda Modeler Gateways.

As contained in the standard BPMN 2.0 (3.2.1), Camunda BPM also includes the gateways on the definition of processes, these in order to control the flow execution within a process based in certain conditions. In the Table (6.2), there are described the four types of gateways.

6.3.2 Modeler Properties

Camunda Modeler enables to configure each of the components by means of the Properties Panel. Here, after selecting a given element, there are organized the possible configurations into several tabs. The general tabs which are shared between the elements are described in the following list:

- General:

  Contains the most important details of a given element, such as the id and the showed name of the component inside the grammar. It is used for all the elements but, depending on it the *details* can be different. For example: for a *Manual activity* there are contained the variable names for the Assignee and Group to which it is assigned, for *Automatic Activities* it contains the delegation and implementation classes and for *Events* depending on the nature of the event, for timers it could contain Duedates or priorities.

- Listeners:

  Used by components such as *Events* or *Gateways* which its main function is based on business variables inside the model, but anyway they could contain any kind of additional implementation code.

- Forms:

  Destined to locate the names of the Form files corresponding to the *Manual Activities* and which include all components with which a user can interact.

- Input/Output:

  For the implementation of the RGI workflow processes, this field is used only to communicate the process variables in and out of the *Sub-Processes*.

- Extensions:

  Used to aggregate additional generic properties to the components. *All of the elements* on the process redesign, that take place during this dissertation, must contain one element in this field and it represents a code used for the Multi-language feature within the system. Additionally, for the *data objects* inside the designs, in the Extensions field, it is added also the variable name that contains its value.

6.4 Cockpit BPM

This feature of Camunda provides a web application to monitor and control processes instances which are running or have finished inside the system [4].

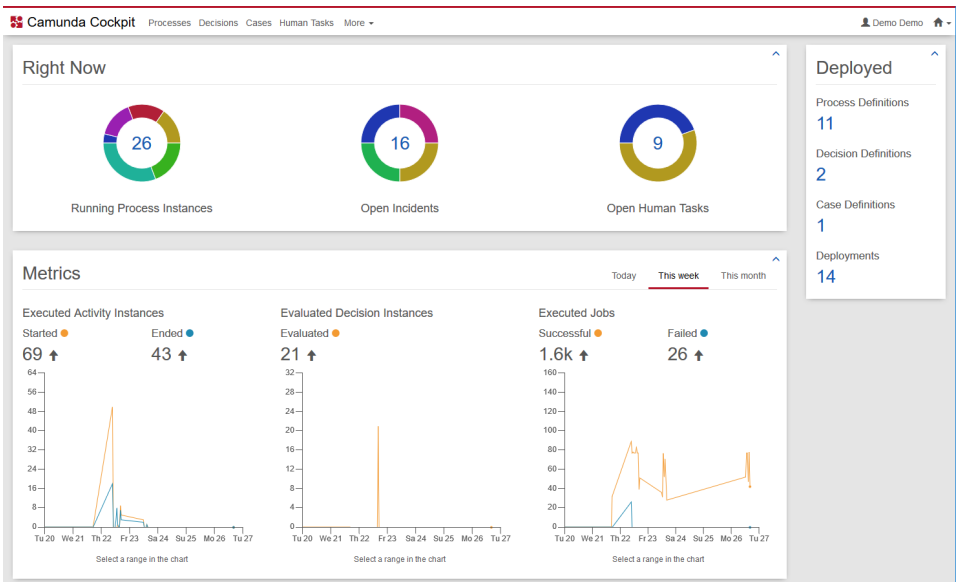


FIGURE 6.4. Cockpit BPM.
Figure reproduce from [4]

RGI Group could implement monitoring activities by means of this tool, advantages are on finding inside the processes instances, characteristics to inspect, or to modify given that it is also possible to interact with them. Users can be anyone inside the organization, either a technical person, like a system administrator, or a person working on the business department of the company. The application allows the user to customize the appearance so the aspects that are relevant, depending on the implementation, can be more easily accessed and therefore it could be possible to edit process instance characteristics, at the same time than analyzing statistics to establish KPI reports. The Figure (6.4) shows the main page of the cockpit application with a statistics-driven aspect.

Chapter 7

Migration

This chapter contains all data related to the actual migration process achieved in the RGI Company for the automated business process, as well called *workflow processes*, regarding the activities of the claim management. First of all, it is mentioned the As-is situation (7.1), this means that it is shown a description of each of the processes with the JBPM implementation and a conclusion on the different characteristics to highlight within the scope of this dissertation, this is the aspects that need some changes in its implementation. At the end it is presented the To-Be situation (7.2), containing the redefinition of processes, the implementation process on Camunda BPM, and a description on how the development team considered the testing to make sure that the implementation on Camunda worked as expected.

7.1 AS-IS

The As is situation is based on understanding the current models of the workflow processes inside the company. Its characteristics and importance within the business and the way they are perceived by the company's clients, this to say the final users of the pass_claims product, which at the end are the ones interested on the actual existence of the processes, as well as the Italian regulations that require some of them.

As mentioned in the JBPM chapter (5), the company currently makes use of the *Jboss* defined engines for the design and management of workflow processes, as well as the developed modeler: the Autore RGI. It is important to remember also the architecture corresponding to the pass_claims system, as graphically explained with the Figure Pass Before Camunda (5.1), is organized in the way that the application server contains inside itself the logic relating BPM processes in addition to the logic of the components of pass developed by the company. In this way, the database is shared between the BPM processes data and the data used by any other of the RGI's components. This represents a risk on performance and replication.

As a further matter, the analysis that has taken place during the development of this dissertation, over each of the processes is the one of looking them mostly in the way of upgrading

them and discovering progress opportunities, rather than focusing on a whole re-definition of them. This is why the as-is situation bases itself on the highlighting of the characteristics that are necessary, discovering of the ones that can be improved and the ones that could be eliminated because they do not represent any value to the process and/or are not requested by the law.

In the following, there will be presented the Autore Modeler design and definition of each of the current processes that take place on the analysis, as well as the description of their characteristics which are keen to change, together with its feasibility.

Administrative Cover Check

The system allows the users to create on the platform a new claim from a potential file claims (PFC or PES). These files are the step before a claim of type CARD (which means that it is related to policies of vehicles) up to that point there is not requested by law any special characteristic or action on the file. However, when the opening of a claim is requested over one of this kind of files, the system requires to have a check on the fact that it is referring to a claim covered by the company. When this action take place it also results useful for a company to trace the results and activities on the system, for control and statistics. In this way, it is possible to consider this process necessary and important within the opening of any claim on the system.

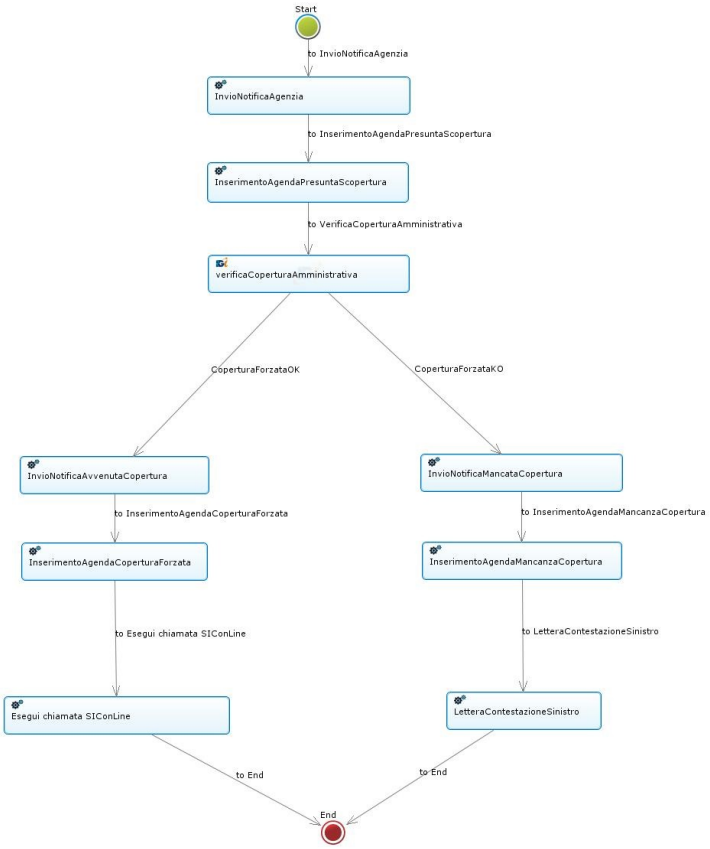


FIGURE 7.1. JBPM design: Administrative Cover Check.
Figure elaborated with Autore RGI Modeler

The starter of the process is then the opening of the claim containing a PFC with the characteristics already described, as the company is interested on tracing this activity then the tracing-on-agenda activities within the process can be considered important to remain. The user interaction activity is vital in this process given that it is the policy agency user who proves and ensures the covering on the claim and so the conditions to opening it.

The process behaves as the following main and alternative scenarios describe:

1. Main scenario:

   The system notifies the presumed insufficient administrative cover to the user of the policy-related agency, through an e-mail or through the Pass messaging system, indicating the PCF number and informing the action that is taking place on that file. At this point the system registers in the agenda a presumed insufficient cover with the message "Presumed insufficient administrative cover verification process started" indicating the user who is

opening the claim and the date. The system creates the activity named "Verify presumed insufficient administrative cover" on the task list of the user in charge of solving the problem (that is to say the user of the policy-related agency), the user starts the administrative cover verification activity while the system displays a summary of the policy and data about the potential cover forcing, in this scenario the user then decides to validate the policy and at this point the system must inform the claim handler and register in agenda the decision. At last, the system must performs an online SIC query as Italian regulation requires it.

2. Alternative scenario:

   In this second scenario, the user of the policy-related agency decides not to validate the policy. What happens here is that the system informs the claim handler with a message and the decision is registered on the agenda. Then, the system carries out the PCF closure and the process finishes.

In the Figure (7.1) it is possible to observe the current design of the process, elaborated with the Autore and which is managed with the jbpm engine inside the company. By looking at the image, it is difficult to identify the automatic and manual activities that make part of it and in general just the basic flow of information that carries out the process. The design in general gives the sense of being antique which could generate a negative connotation when interacting with clients and decision-makers when describing for selling the process as part of the product to the final customers.

Notify Take In Charge

This process describes the steps carried out when it is performed an acceptance of a claim in the system. This condition can be initiated by means of three situations:

- On **opening** the claim, by the claim handler/agency user.

  As soon as the claim is created and routed, the system create as many work queues as there are claim handlers assigned to the types of loss. Each queue is sent to the relevant claim handler, established by the PASS_Products rules.

- On **registering** a new type of loss/damage on a claim that is already open.

  A new activity in the tasklist is created towards the relevant claim handler, to manage the type of loss: this happens only if the system makes sure that for that claim and claim handler there is no scheduled process already active.

- On manually **transferring** a type of loss/position/claim.

The system initiates an activity towards the tasklist of each claim handler selected as the recipient of the transfer, only if the system makes sure that there has not been activated any scheduled process on that claim and handler.

The opening of a claim can of course be considered a vital and necessary process in the claim handling sector. However, it can be understood as a very simple process in which the handler decides or not to work on the claim; or if instead, it redirects it to another liquidator. For this operation the company considers relevant to keep a record of the entering of the claim is registered into the system, this is to make sure that the claim has been correctly assigned to a person with the capabilities of handling it and also to make sure liquidators take the responsibility of accepting what it corresponds to them instead of passing it around, so at the end the log of this operations helps on auditing the process which makes this activity relevant.

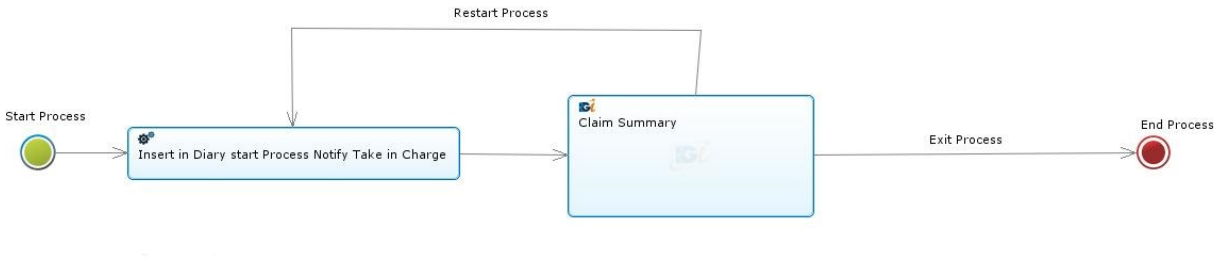


FIGURE 7.2. JBPM design: Notify Take In Charge.
Figure elaborated with Autore RGI Modeler

The Figure (7.2) illustrates the current design of the process, which has been elaborated with the Autore RGI and managed with the jbpm engine described in the JBPM chapter (5). The process in general is designed in the way that it works well and does not really represent errors or deficiencies for the claim management. As highligted in the previous process, the design in the Autore Modeler gives the general idea of being old and this could generate a negative connotation when interacting with customers and administratives.

The process behaves as the following main and alternative scenarios describe:

1. Main scenario:

The process is initiated as a result of one of the three actions already described for the opening of a claim; this is followed by the activity created on the tasklist of the handler

which is addressed as follows: To the claim handler considered relevant for the type of loss by PASS_Products automatic routing. There could be presented the situation in which the system also considers addressing the claim to the claim handler to whom one or more types of loss have been assigned manually. For Italy, there is an exception for type of loss for which the Position Notification process has already been initiated, he regulations applies in the way that these kind of loss are not managed here.

At this point, the system performs an automatic update of the agenda, by entering a record on it with a message indicating that the acceptance procedure has been initiated for the type of loss involved, it must be repeated for all type of loss subject to the same tasklist. Then, the claim handler accesses the portal and by following the route to the summary of active processes in its tasklist and selects the acceptance to perform the activity. The system then, leads to the "Consulting" activity by displaying the claim Overview, here the claim handler can perform some modifications and then the option of managing is selected the system records the decision of managing and the process finishes.

2. Alternative scenario 1:

The claim handler instead of selecting the acceptance of the activity, it chooses to transfer it to another claim handler. (This option is available just for the users with the permissions to transfer). When doing this, the system the system displays the manual transfer function, in which the user fills some information regarding the transfer variables and when saving, the system: Sets the "transferred" status on all types of loss subjected to manual transfer, initiates a many work queues as necessary for the "take in charge" on the transferred destinations. If at this point, there are still other types of loss in the assigned or transferred and assigned status for the claim handler in the work session, the system once again displays the Claim Overview page, allowing the assigned types of loss to be managed. Otherwise, the process finishes.

3. Alternative scenario 2:

This scenario describes the opportunity that the user has to take a look to the claim without accepting it, postponing completion of the task to a later moment. Instead of accepting it , the user selects the option to exit on the claim overview page, at this moment the system displays the tasklist of the user, without completing the process.

Position Communication

The starter event of the process is the opening of a claim of type rca (which can be card or no card). The purpose of the process is to guide the liquidator in the management of these claims in periods that do not overcome the deadlines configured by the company if there is not present a

damages request or deadlines defined by law and in detail from the articles 148 and 149, anytime there is a damages request.

The timing can fluctuate based on the types of damages request. For example, if the damages request is missing in the claim file, then the payment terms are suspended and when the system receives the notification of modifications on the claim in which the requested documents are completed, the terms are reactivated again. Therefore, the process can be started in two different stages: when opening a claim and when modifying and completing one, already saved into the system but that had not completed the requirements for executing the process.

The process is managed from the point of view of damage causal, each activity on the tasklist that will be created reefers to a causal, this means that if there is more than one causal for a claim then there will be more processes instances started. The handler will take position on the claim which is subject of several deadlines, this means that the liquidator will have the voice to decide weather to issue an acquaintance, make a bid on the claim or just decline it. If necessary, the processes of payment deadline and authorization will be started. At last the process will finish.

As shown in the Figure (7.3), the handling of deadlines is not done by the bpm. Instead the company has found the way of managing the deadlines by means of interacting with the process from the outside, this means that the process reacts constantly to batch activities and external flows.

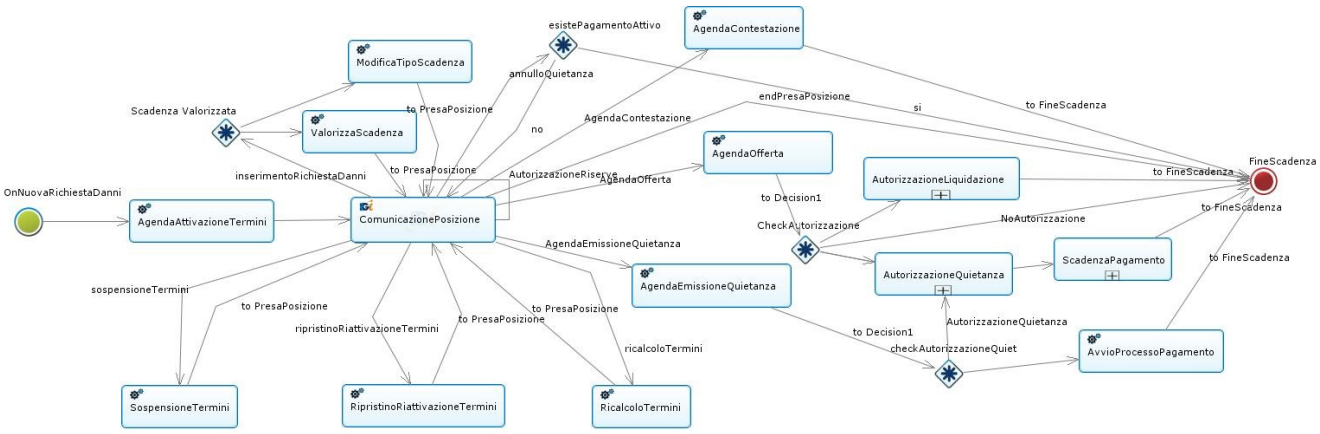


FIGURE 7.3. JBPM design: Position Communication.
Figure elaborated with Autore RGI Modeler

Payment Deadline

The starter event of the process is the issuance of an acquaintance relating a damage causal for which a position communication process has already been initiated, but which has not been

transformed into liquidation. The acquaintance of payment can be issued indistinctly by the system or by the position communication process. This process is relevant given that it helps and directs the user into the management of the deadlines that regard any kind of payment.

Deadlines could be conventional, which means that they are defined by the company, created when there is not a damages request or by regulation as defined in Articles 148 and 149 and by Decree 254, if there is a claim for damages. Specifically, the support given to the liquidator user is provided at the business process stage in a stage in which it has already been taken up a position with regard to the damage, by issuing an acquaintance, that has not yet been turned into payment.

The sending of the acquaintance creates a deadline (15 days) in which the company must provide for the actual payment. The process considers the possibility of registering the return of it (optional) and proceeding to transform it into liquidation (mandatory), it also enables the possibility to perform these operations at the same time.

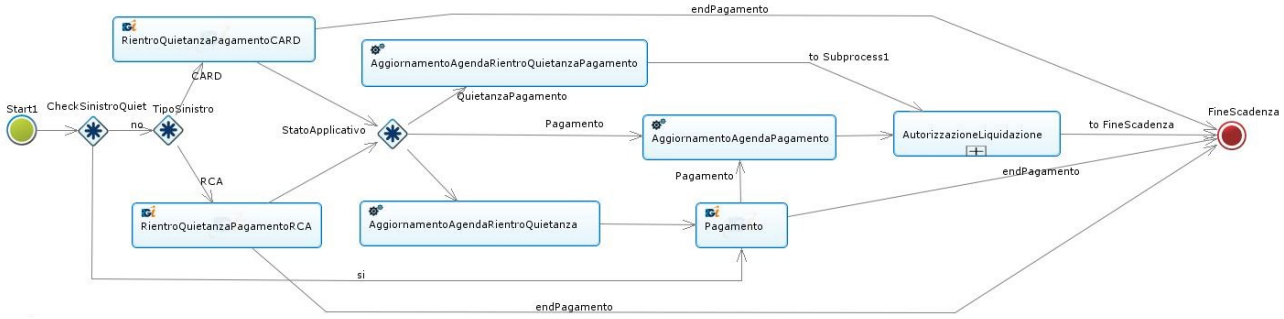


FIGURE 7.4. JBPM design: Payment Deadline.
Figure elaborated with Autore RGI Modeler

As it becomes evident in the Figure (7.4), the process does not rely on the use of timers at the process level to handle the deadlines, which makes it necessary to adjust in the redesign of the processes. RGI relies on the use of batch processes which interact with the bpm processes for the managing of deadlines. However, the company makes use of the engine for the registration of records on the agenda and of course the managing of the tasklist for the users.

The process behaves as the following scenario describes:

- Main scenario:

  The process starts after the saving of an acquaintance that reefers to a damage causal of a claim RCA CARD. A task is created on the tasklist of the handler and then the system periodically checks if to the claim has changed and an acquaintance has been returned, when this occurs the system creates the payment activity on the liquidator tasklist.

Depending on the type of claim, the system calculates the deadlines for the payments and acquaintance. If the claim is CARD, the associated payment deadline will have the possibility to change and be set on a later moment when the acquaintance has been provided. If the claim is NO CARD, the system will give 15 days on the date of the deadline if the acquaintance has been accepted. When the liquidator selects the activity on the tasklist, and the system will enable the possibility to choose between the options: Return acquaintance, payment, and Return acquaintance with payment. For the payment related activities there is also activated the authorization process related and after the authorization is accepted, the process finishes.

Verify Claim Anti-Fraud

This process models the functionality for the management of data relating anti-fraud, this is to allow the user to carry out evaluations and operations for processing a suspicious claim; operations such as view, examine and manage. It enables to act in compliance with the current legal regulations by preventing fraudulent situations that would result in the dispersal of economic resources or worse, in prosecution. And that is why this verification is considered relevant in the workflow and therefore it is important to make sure that is is being executed in proper conditions, to be offered to the customer companies.

The system offers the possibility to search and inspect claims that are considered suspicious and access the anti-fraud data functionality of one of them, for then deciding if the claim is fraudulent or if instead it can be eliminated from the suspicious list and handled by liquidators. The process behaves as follows:

- Main Scenario:

The user fills in the searching page presented by the system in the section anti-fraud of the workflow page, the system presents a list of suspicious claims that go according to those parameters. Then, the user selects to see the detail of the claim and, in this moment the system creates a task in the tasklist of the group of the user. If the user determines that the suspicious claim is fraudulent the claim remains in the list and the process finishes, if instead it is considered legitimate and the claim involves payment activities, it will be necessary another verification which is performed by users belonging to the group with administrative privileges, decision is traced into agenda and the process finishes.

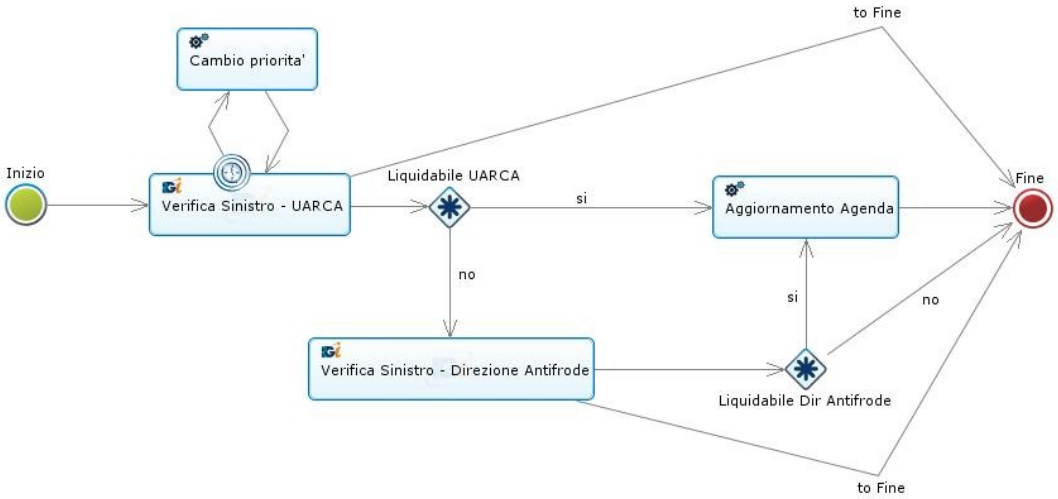


FIGURE 7.5. JBPM design: Verify Claim Anti-Fraud.
Figure elaborated with Autore RGI Modeler

For some processes, the company has decided to define a way to interact with priorities given that they represent an important aspect in workflow management and in the insurance domain. This is done in the way that, when getting close to the deadlines involved in the process, the manual activities present in the tasklists have to be shown with a higher priority. This is to help the liquidator on working on a claim, which is more in need of it. As the Figure (7.5) shows, the process of verifying the anti-fraud, makes use of the concept of priority, as jbpm does not provides a tool for updating these priorities, the company found a solution to this problem by adding timers to the tasks, calculating priorities and the re-creating the activities in the tasklist.

Manual Deadline

Theoretically, this is a simple process within the workflow, it just models the idea of an reminder for the liquidators. A manual deadline is created and checked by a user at any time during the development of its job. The avoidance of the deadline is carried out by the same assignee/liquidator, and represents the completion of the activity described as well as the finalization of the process.

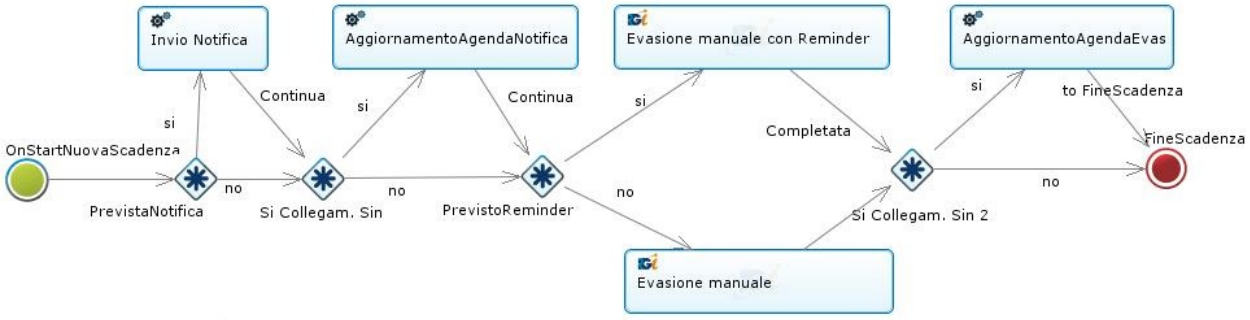


FIGURE 7.6. JBPM design: Manual Deadline.
Figure elaborated with Autore RGI Modeler

The process offers the possibility, when instantiating it, to add reminders or notifications by email to the deadline created. Whit jbpm, the execution of this feature allows the system to inform and alert the user *once*, when waiting for the evasion of the same. As shown in the Figure (7.6).

The process behaves as the following scenario describes:

- Main scenario:

  The process starts when the user access to the workflow menu in the web application and selects the option of "New deadline", at this moment the systems shows a form to the user in which it is asked a title, description, relevant dates (deadline and reminder), mail address if necessary and gives the possibility to attach a claim to the deadline to be created. The user completes the fields and confirms. The system records the operation in the agenda of the claim (if attached) and then creates the activity inside the tasklist of the liquidator. If necessary, reminders and notifications will be send to the user until executing manually the activity.

Possibility Recovery Insured

The purpose of the process is to enable the decision to a handler whether or not to initiate a recovery action to the insured person of a company by means of another process, called "Recovery Insertion" (this process is not analyzed during this dissertation given that takes place on a different stage of the migration plan of the company). This process is based on the completion of data to make available a complete claim to the handler. It is applied just for the claims of type card that have a debt to pay and which include one of the following conditions: driver was drunk or under the influence of drugs, insured not qualified for driving and the vehicle is not complying with the circulation card provisions.

The user is therefore required to decide whether or not to activate a claim towards the company's insured person. If he has decided to proceed in the affirmative, the process is started. The process is simple, it is based just in the completion of data by the claim handler, the system guides the user through the navigation to enter the recovery data. At the end the data is saved and the process is finished.

The activity is attached to a timer (Figure 7.7) that fires when the expire date of the claim arrives. At this point the process will also finish.

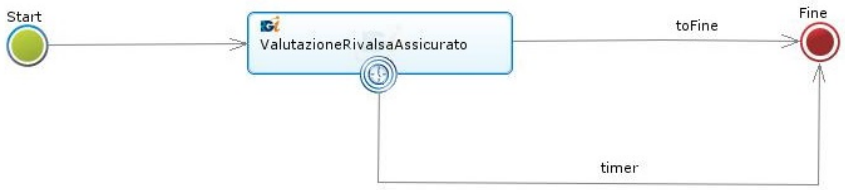


FIGURE 7.7. JBPM design: Possibility Recovery Insured.
Figure elaborated with Autore RGI Modeler

This process enables the possibility to observe that the jbpm engine offers the possibility to attach timers to the manual activities. However, when these timers fire, the activity related will always be interrupted and the flow of information of the process will continue through the timer further operations.

Report Potential Claim

The Potential Claim represents the first stage of a claim, it is a report of damages that has not been yet turned into an actual claim. At this point in time, the process of reporting it is triggered by the reception of a communication sent by ANIA (batch activity) in which it is send data of a potential claim of type card debtor for which the insured's complaint is not present, or the request of opening of a card claim without provisioning the insured's compliant. The Figure (7.8) pictures the procedure of the possible scenarios that interact with the potential claim. The company, in the case Ania's communication reefers to a debtor claim that requires a signature or two, must respond to the counterparty company; this response can be the declaration of liability by the insured, the negation of event (NE) or the the non-applicability (NA). This response is sent by email, by means of an automatic activity within 28 days of the reception of the communication. The agency/broker may complete the missing information on the claim (perform an upload of the compliant/damage request), if the upload is not done, the process finishes; according to which another response from Ania can be made.

The process considers another three deadlines more, these are set to remind to the company when the complaint has not been articulated. The system reacts after 5 days (a letter is automatically sent to the insured party), 18 days (a reminder is automatically sent to the agency/broker) and 25 days (a registered letter is sent to the policy-holder). When the compliant is completed, the system will react depending on the responsibilities attached to it, performing different validation activities on the potential claim and the process execution finishes.

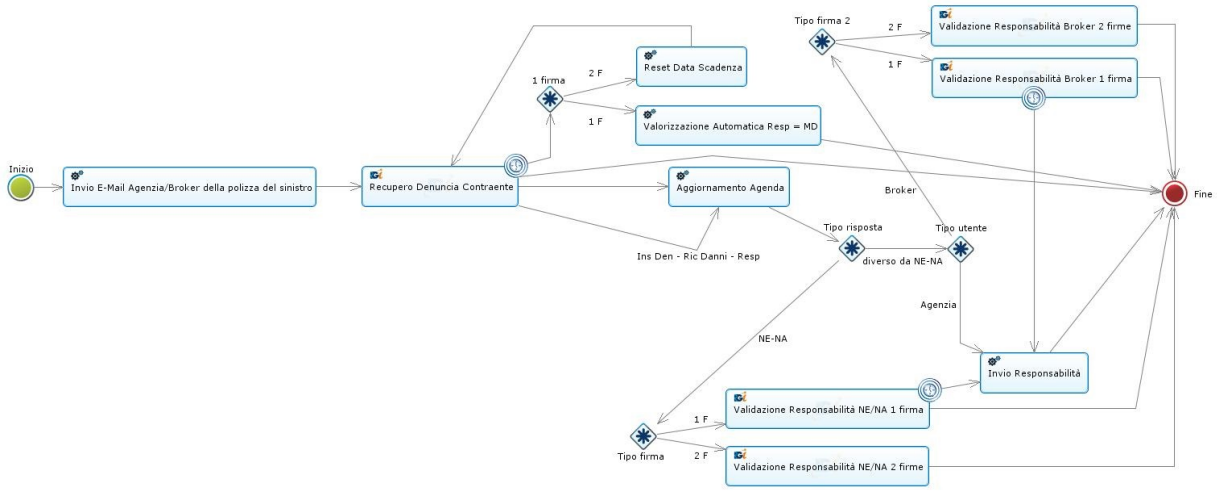


FIGURE 7.8. JBPM design: Report Potential Claim.
Figure elaborated with Autore RGI Modeler

The deadlines corresponding to the reminders to the company are handled with external activities to the bpm definition, this is because jbpm engine definition of timers does not allow the activity to continue its execution. This decision has been done given that since more than one timer would be necessary.

Discordant Responsibility Deadline

This process is started in a different way with respect to the ones previously analyzed in this section, it is much more simple from a point of view, this meaning that, it is not a user or a condition to start the process but it is simply a notification received by the entity ANIA, the notification indicates that the companies representing each of the parts of the claim, registered with different responsibility. The claim has been saved into the system with the characteristic of responsibility not yet defined, this is means that it is up to the handler to indicate the responsibility in the system which then will be re-send to Ania for the registration. When the communication is received from the entity Ania, the system creates a task in the tasklist of the

liquidator who must handle the activity. The handler would then, have the option to accept the responsibility and perform payment procedures, request arbitration for the claim because the responsibility is still not decided and the parts do not agree on it; or modify the responsibility in the way that goes along with the responsibility previously defined by counterparty. Apart for the option in which the arbitration is requested, the process finishes. When the arbitration is necessary to continue the process, a task is added into the tasklist of the Sarc-office user whom must confirm the opening (and the process finishes) or request to the liquidator information or documents to add to the file.

The arrival of the communication from Ania requires from the handler to execute the acceptance of a task that aims to take in charge the following decisions:

- The choice of acceptance of the responsibility defined by Ania or confirm it, which adjusts automatically the one declared by Ania and by the counterparty.

- The choice of proceed with the arbitration and this requires the creation of a task on the Sarc for the actual arbitration of it and whom, at the same time must decide if to open or not the arbitration or request additional documentation. In the case of opening the arbitration, there will be present an automatic task in charge of remembering the Sarc periodically about the importance of the operation.

If deadlines are not accomplished and the responsibility definition has not be presented by the company, Ania will consider the acceptance of the counterparty report. At process level, it is implemented with timers with the deadline date for the arbitration.

This process models a procedure that is requested by the Italian regulations and, therefore its definition must remain within the pass_claims product. As evident in the jbpm implementation presented (Figure 7.9), there are many activities associated to deadlines and which require timers. As the analysis of the previous processes has shown, jbpm engine does not provide a complete and trustworthy management of timers. In general, for this process in particular timers have worked fine and in general the process does not present any weakness regarding the design. Priority however is a necessity, given that a single process instance is composed by several activities which have attached a timer, becomes important to make sure that the process gets to be finished inside the deadlines established in each task and inside the deadline of the claim that it reefers to.

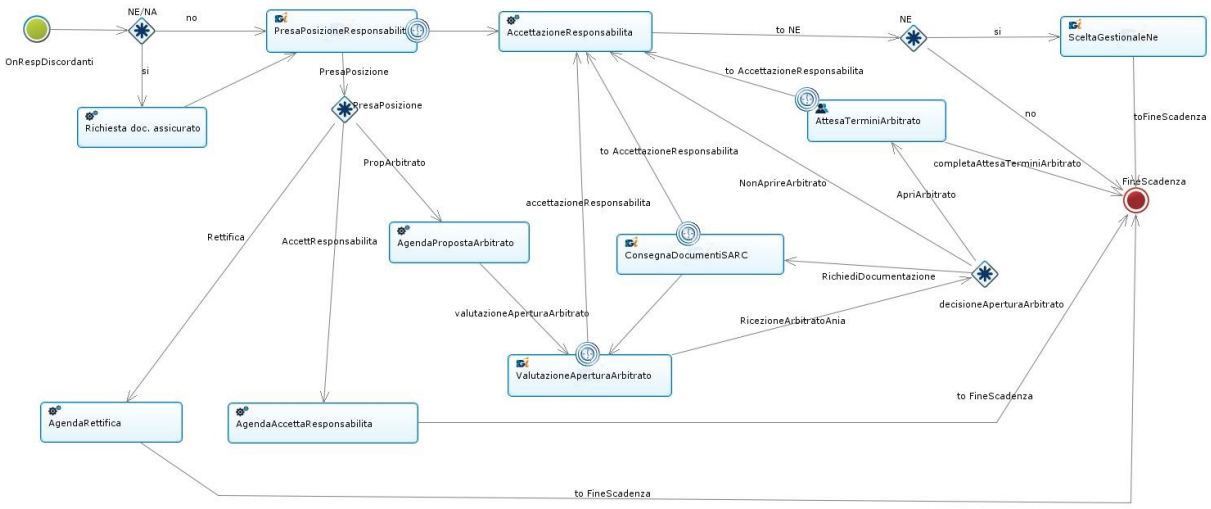


FIGURE 7.9. JBPM design: Discordant Responsibility Deadline.
Figure elaborated with Autore RGI Modeler

7.1.1 Partial conclusion

After analyzing each of the previous processes, it becomes relevant to underline that the characteristics identified as possible for a change are most of them common between each other; this could be understood as a problem that regards not just the design of each process but of the engine that holds them. It is clear that the company is currently on a place where it needs to make use of mechanisms and instruments that provide advantages and produce products that can be competitive in the field. At the end, this could be seen as a lack of experience and maybe naivety of the company some years ago when choosing the jbpm engine approach and the decision to develop the modeler, for the management of the workflow processes.

Apart of the deficiencies and disadvantages found on each of the processes, the fact of having one database and sharing the same logic allocation with the whole pass_claims system, could represent a design decision with the conditions to change, this is because it is provoking deficiencies in terms of availability, efficiency and performance. The processes' instances could remain in memory for years given that sometimes liquidators and claim handlers decide not to operate on a claim for reasons of the Italian regulations changes, repeated procedures on claims inside the system or deadlines entered wrongly; when these situations arise, claim information could remain in memory forever. Additionally, having the business data and the bpm data inside the same database, means that not only the claim information is stored but also all information regarding activities, groups, claim handlers, datelines and process instances' states.

Additionally, jbpm is outdated in the way that it does not follow the BPMN 2.0 standard for the definition of the processes and its implementation inside the company does not allow the multi-language feature which could generate a smaller sector of customers.

In terms of the modeler implemented, it seems relevant to mention that the interface could have characteristics that provoke not to have attractive models of the processes, giving the idea of being out of date or antique. This could be important in the way that final clients could have a wrong reaction when processes of a product are being presented. Giving the idea that the company in general or the product does not applies updated technology or methodologies when talking about workflow management.

The presented table (7.1) summarizes the aspects of the analyzed processes that have been identified as possible for a change.

Characteristic	Annotations
Timer management	Deadlines represent an important matter in the workflow management of RGI, the engine of jbpm provides the usage of timers that can be attached to activities. This feature however, seems not to be exploited in totality given that some processes include activities that not always have to be cancelled when a timer triggers. Also, it is not possible to include more than one functionality (several timers) within an activity. Claims management department has found the way of managing the deadlines by means of interacting with the process from the outside, this means that the process reacts constantly to batch activities and external flows, however this represents double work in the way that, not just the engine of the bpm is in charge of managing the processes instances, but external automatic activities have to be controlled.
Priority management	In order to help claim handlers, the system provides the feature of priorities, jbpm sets in each activity a number between 1 to 3 (1 = low, 2 = intermediate, 3 = high) to manage priority, in this way the user that enters the tasklist can have the possibility to see the most urgent activities to handle. This lowers the probability of missing deadlines and organizes the work space so productivity increases. However, jbpm offers the possibility to set it on each activity at its creation and it is not modifiable in time. The way of handling this absence is the one of adding additional activities on the design of each process, attached with timers that fire every day and recreate each activity, modifying its priority if necessary. This creates overload of the system and represents a visual change on the design of the processes which may cause doubts by part of decision-makers and clients.
Design	The Autore RGI developed by the company when the department of claims management started, offers a design that accomplishes what is relevant and necessary. However, as it produces the graphic representation of processes, which is the way clients and managers understand and analyze them; it becomes necessary to provide an appearance that inspires speak for the aims of the company, in the way that it represents the idea that RGI is based on new technologies.
Data allocation	The company makes use of the same database for the allocation of the logic of Pass_claims and the bpm. This generates deficiencies in terms of performance and efficiency. At the same time, the amount of data stored regarding the bpm is high and increments needlessly. This is because many process instances remain in memory for many years as a result of Italian regulations changes, repeated procedures on claims inside the system or deadlines entered wrongly.
Language	The implementation of the bpm with jbpm does not support the multi-language feature. This is, the definition of the processes is done in Italian and is not configurable. Even if the systems Pass_claims gives to the user the possibility of changing the language (Italian, English, Spanish, French and German) and the application is multi-language, the workflow section inside it is available just in Italian and therefore the messages, design and information relating the processes is presented to the users in Italian language only.

Table 7.1: Summary of the As Is situation.

7.2 TO-BE

First of all, it is important to remember that as previously explained in the introduction (1) of this dissertation, that the general goal of this migration process is to evolve and to allow the correct automation on the different business processes. In this way, make of RGI an organization that can run in a more efficient coherence with its customers. Secondly, to understand that the information technology is the key differentiator that has to comprehend every stage of this process, and this is important mostly when taking about processes that take place on the production of software products.

The To-Be situation models a workflow system which takes the most important aspects from the already designed processes and introduces them inside the Camunda engine for the development of claim management inside the company. In contrast with the jbpm organization within the company, explained in the JBPM chapter (5), the Camunda implementation within the bpm of RGI can be logically divided into three modules, these are illustrated in the figure (7.10).

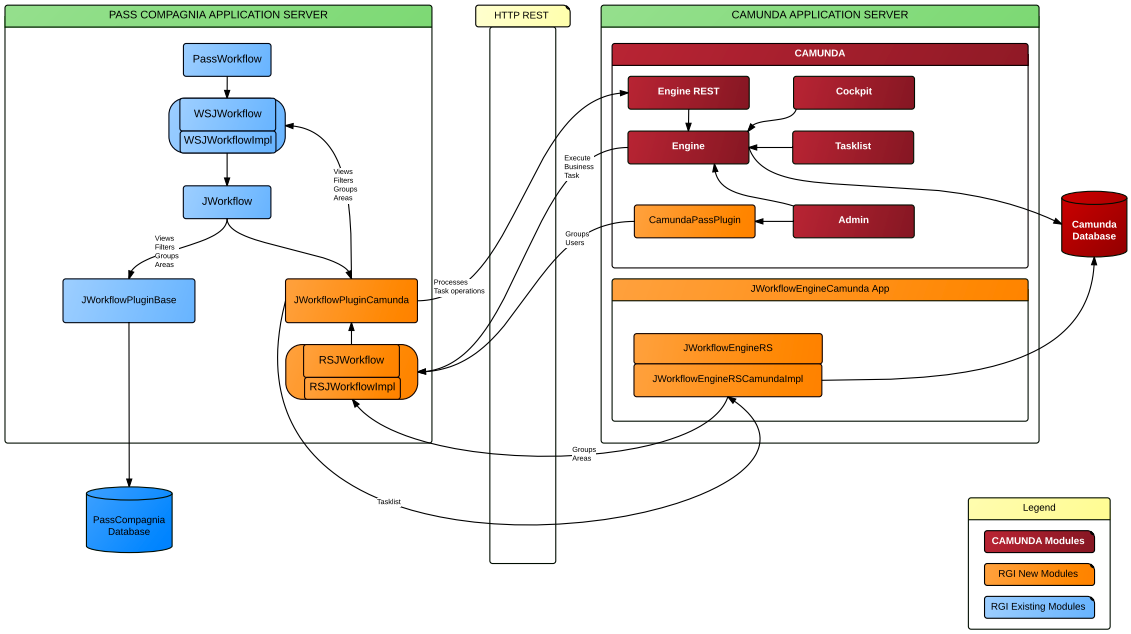


FIGURE 7.10. GUI Claims.
Figure reproduced from RGI System web application.

This architecture is organized in the way that the logic of the pass_claims system is inside an application system, with its database where just data related to the logic is stored. The components that link this logic with the bpm (the orange components inside the pass application server

in the image (7.10)), communicate by means of web services, with an additional application server where all components in charge of managing the bpm are located. This additional application server holds the camunda components (in red), which are provided by the Camunda engine and interact at the same time with the pass components (orange components inside the camunda application server).

In the necessity of improving the processes design it is important to notice that the company is taking great advantages of Camunda bpm, given that it is a tool that not only offers a more modern and better organized design of processes but, most importantly, it defines standards for managing those processes correctly, as shown in the Camunda chapter (6). RGI found on JBPM and in the Autore a good solution at the moment, also it had the idea of developing its own modeler and of grouping the logic of the system with the logic of the bpm processes together. Right now the company is in a position of evolution and, changes in this field are now necessary, Camunda offers not just a good solution for the management of bpm but it also represents evolution within the future because, camunda as a product, is also evolving and changing with the objective of offering new solutions.

7.2.1 Implementation

To start working with Camunda it was necessary to set the environment in the way that the following characteristics are accomplished:

- Create a java class that implements the *org.camunda.bpm.engine.delegate.JavaDelegate* interface and its method *execute()*, with the logic of the **automatic tasks or events**.

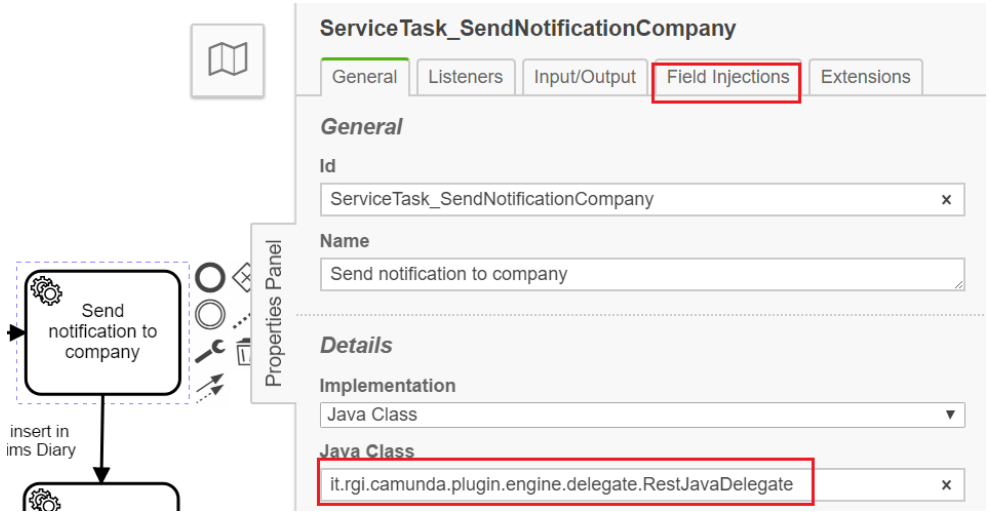


FIGURE 7.11. Delegate classes for Automatic tasks and Events.
Figure reproduced from Camunda Modeler.

To allow the retro-compatibility, it was decided to create just one delegate class, which is general for all the automatic tasks. The method *execute* makes use of the parameter taken from a Field Injection (*passClassName*). This parameter contains the name of the actual implementation of the automatic class. The delegate class creates an instance of it and its execution starts. This delegation class is also used for the events, in the same way, the delegation class starts the execution of the real class that handles the event.

- For the **manual tasks**, which are the activities within the process that have interaction with the user, it was necessary to link XML forms, these were available for the previous definition of the processes and so it was decided to re-use them. Some of them required small changes such as the addition of buttons or fields to show to the user. The form name is added in the properties and the engine links the process to the actual form when the flow of execution arrives to that point.

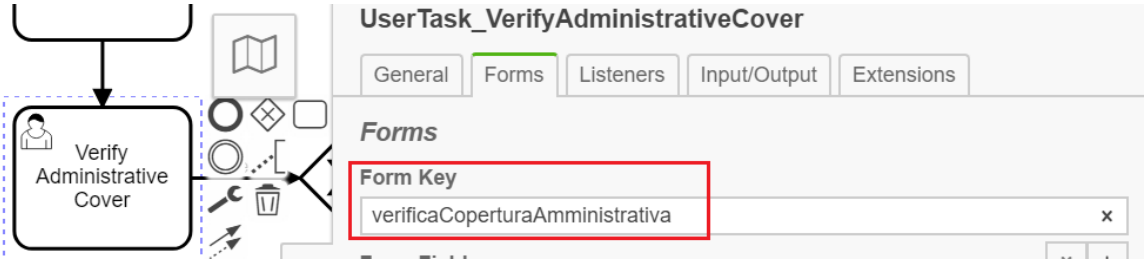


FIGURE 7.12. set the xml f for Manual tasks.
Figure reproduced from Camunda Modeler.

In the Properties panel, and more exactly in the tab *General*, all related to user profiling is added. The names of the variables related to the activity. These are the liquidator, group, priority and deadline date. These variables can be set by putting the name of a business variable, with the character '#' or by writing a boolean expression in the way: '$*expression*'.

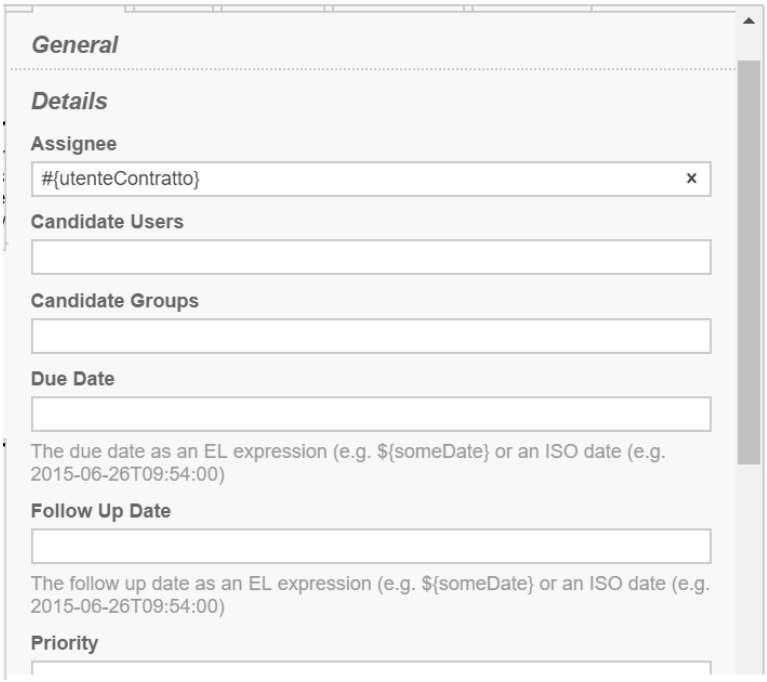


FIGURE 7.13. Variables to set in Manual tasks.
Figure reproduced from Camunda Modeler.

It is relevant to indicate that to assure retro-compatibility in the system it was necessary to create a mechanism to handle priority and due dates within the system.

- Camunda uses the range between 0 and 99 to define the prioritization between tasks. In this way the activities set with the number *0* have low priority, with number *50* are medium and with *99* are high. In contrast with the range between *0* and *3* that uses jbpm.
- The timing values are also managed differently for both of the engines. Jbpm implementation in RGI uses a String object filled with a defined structure:
  n "years" *n* "months" *n* "days" *n* "hours" *n* "minutes" *n* "seconds" ,
  where n represents any integer number; Camunda implementation, instead follows the Standard format *ISO_8601*

For the management of these two differences, for each workflow plugin (camunda or jbpm), it has been added a resource that maps the implementation class for each plugin, this is a java class that refers to a single interface with the task of doing the conversion of the timer and priority value.

For the difference regarding time definition, the system now behaves in the following way:

- Plugin camunda: the timer value is returned as is send. Example:

Input: "P3Y6M4DT12H30M5S"

Output: "P3Y6M4DT12H30M5S"

- Plugin JBPM: the timer will be convert in the proprietary jbpm format. Example:

  Input: "P3Y6M4DT12H30M5S"

  Output: "3 years 6 months 4 days 12 hours 30 minutes 5 seconds"

In order to put this conversion into effect, it was created the class *WorkflowTimerService*. Each time a time definition is needed, it is created an instance of it and, it will check on a property of the system which tells the engine that is being used. This is done with the instruction: *WorkflowTimerService.getInstance();* then it is necessary to access to the metod getTimer: *WorkflowTimerService.getInstance().getTimer("P3Y6M4DT12H30M5S");* which will return the corresponding output.

Additionally, to solve the difference problem in the managing of the priority, the solution includes three new constants: LOW, MEDIUM and HIGH. The systems behaves in the following way:

- Plugin camunda example:

  Input: "HIGH"

  Output: "99"

- Plugin JBPM example:

  Input: "HIGH"

  Output: "3"

As for the previous solution, a new class has been created and it is necessary to instantiate it when the usage of a priority is required. The class *WorkflowPriorityService* and in order to put the conversion into effect the following is done: *WorkflowPriorityService.getInstance();* then, the method getPriority is accessed with the instruction *WorkflowPriorityService.getInstance().getPriority("LOW");*

- The **gateways** can be differentiated if they are located after a manual activity or if they are not. In the following way:

  - If the gateway is after the execution of a manual task in the design of the process, then it is up to that manual activity to set a defined variable called *LAST_TASK_OUTCOME* (defined with this name to make it general and standard for all the processes). This variable is global for an instance of a processes execution and is stored in the db. This kink of gateways receive the name of *Outcome* for all the processes.

In this kind of case, the gateway just performs the routing activity, based on the condition set during the definition of the process, for each of the flows that go out from it.

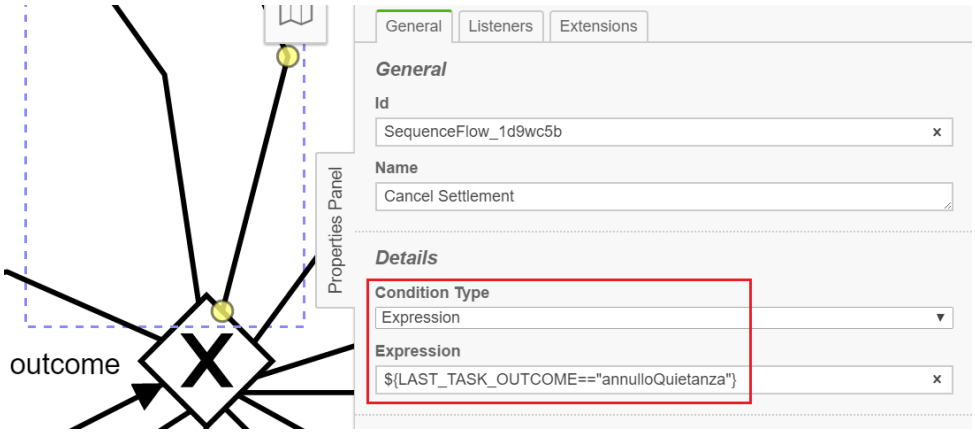


FIGURE 7.14. Flow out of a gateway v1.
Figure reproduced from Camunda Modeler.

The gateway validates the condition written inside the expression field in the General tab of the properties panel. These conditions consider always the variable *LAST_TASK_OUTCOME* and, either business variables or defined values. The flow of information continues for one or more of the outgoing options, depending on the type of gateway.

– On the other hand, if the gateway is not after a manual task, is up to the gateway to set the *LAST_TASK_OUTCOME* so the flow of information can continue.

In this case it was decided to link a java class to the gateway, this means that it behaves in the same way than the automatic tasks. Therefore, it is added the definition of the *delegate class* and set the name of the class holding the logic inside the variable *passClassName*.

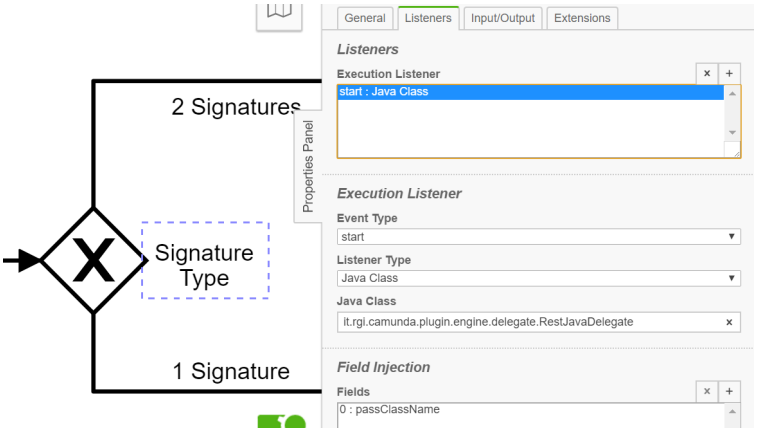


FIGURE 7.15. Gateway v2.
Figure reproduced from Camunda Modeler.

In the same way, the outgoing flows of the gateway contain an expression which considers the *LAST_TASK_OUTCOME* and the flow of information continues depending on it.

- Each process shows inside the web application different characteristics that determine the state of the claim within the context of the process, this information is recognized as **business variables** and it is stored within the bpm definition of the process as data objects and is added inside the design for the understanding of the relevant data of each of them.

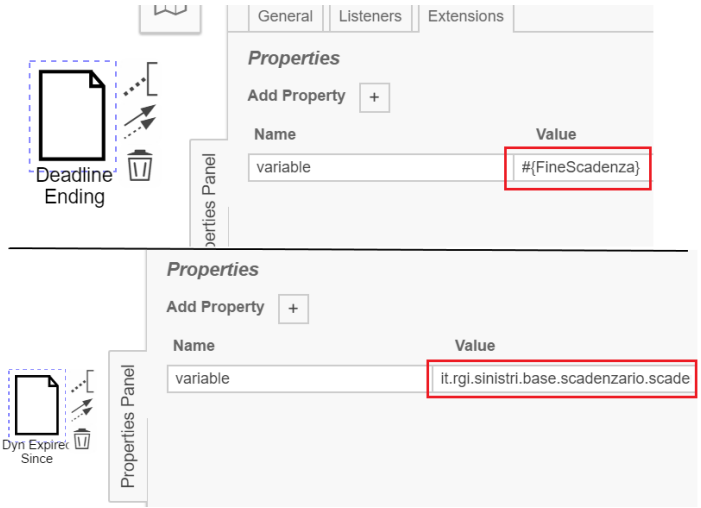


FIGURE 7.16. Business variables.
Figure reproduced from Camunda Modeler.

Business variables can be static or dynamic and this means that it depends if the variable is modifiable during the execution of a task or not. It could be for example just a due date (static) or the calculation of the difference between that date and the current date (dynamic).

- **Sub-processes** are designed with the *call-activity* feature that Camunda offers; which allows to define the additional process in a different bpm file, which means that the process can be instantiated either inside another process as a subprocess or outside with an independent instance. It is just necessary to put inside the name *field*, the id given to the process design when defining it.

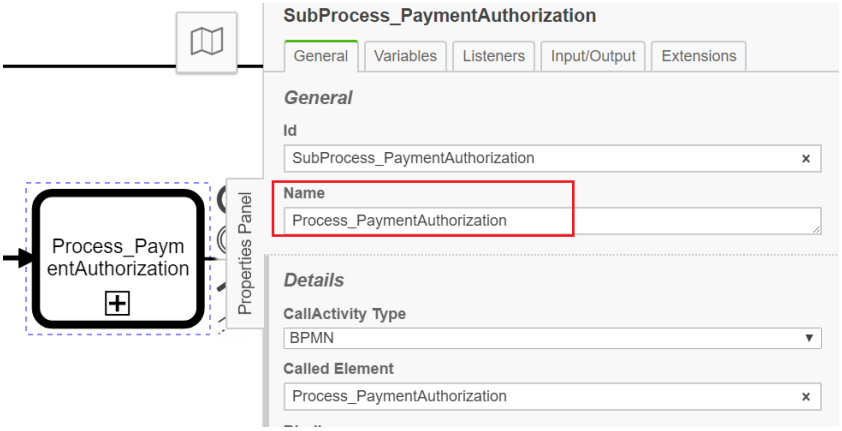


FIGURE 7.17. Subprocess.
Figure reproduced from Camunda Modeler.

The business variables values are passed to the subprocess by means of the tab variables inside the process that contains the call-activity element.

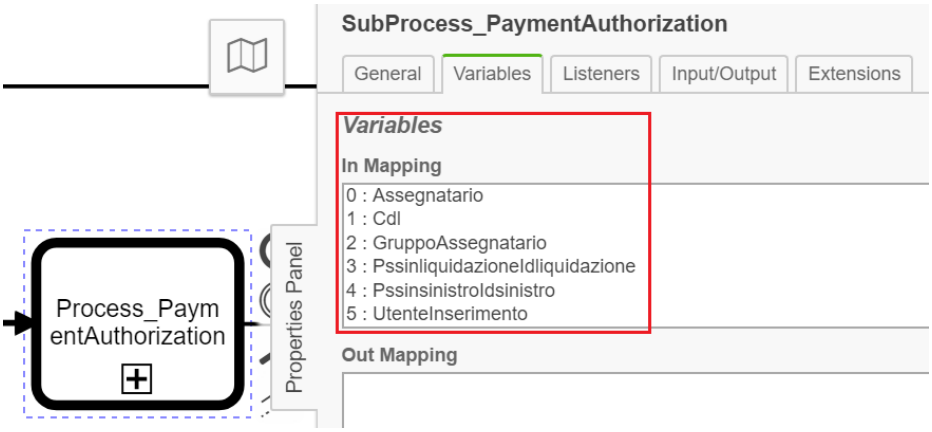


FIGURE 7.18. Variables of a Subprocess.
Figure reproduced from Camunda Modeler.

- For the detail of adding the **multi-lingual** functionality to the bpm it was defined the property *i18n-label* which holds he value corresponding to a code inside a set of files *.properties*, these files are in the package *passsinistriapp/webinf/messages/MsgSinistri/* and there is a file for each language supported by the bpm. The lists link the code with a particular string that, then will be shown to the user in the correspondent language set in the properties of the system.

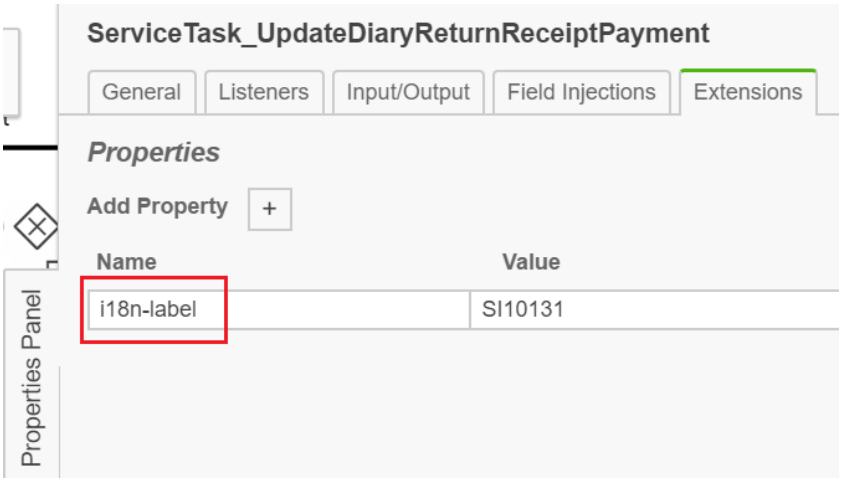


FIGURE 7.19. Multi-language property.
Figure reproduced from Camunda Modeler.

This feature is applied for all the elements inside the process design which contain any text or data shown to the user.

- The timers were handled in the way that there was made the differentiation of the intermediate, boundary and boundary-non-interrupting timer components.

  - Intermediate and Boundary timers are handled in the same way, this is, a timer definition is filled inside the properties panel. The value must follow the standard ISO_8601 either if it is a defined value inside the modeler or the content of a variable.

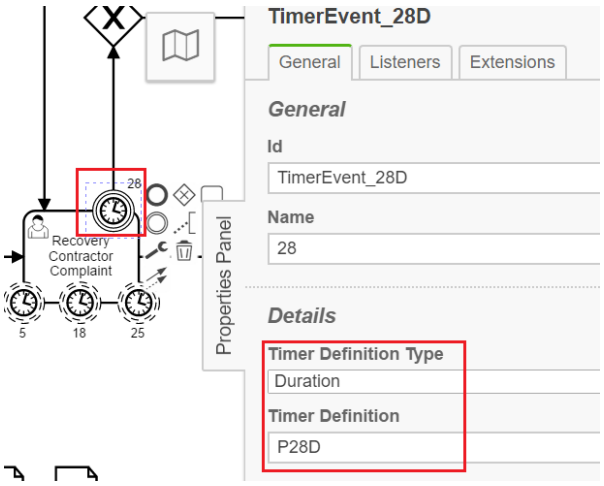


FIGURE 7.20. Timer Boundary.
Figure reproduced from Camunda Modeler.

– Intermediate Non-Interrupting timers instead, as they allow the execution of *additional* flows within the activity and when fired, they are set in a different way.

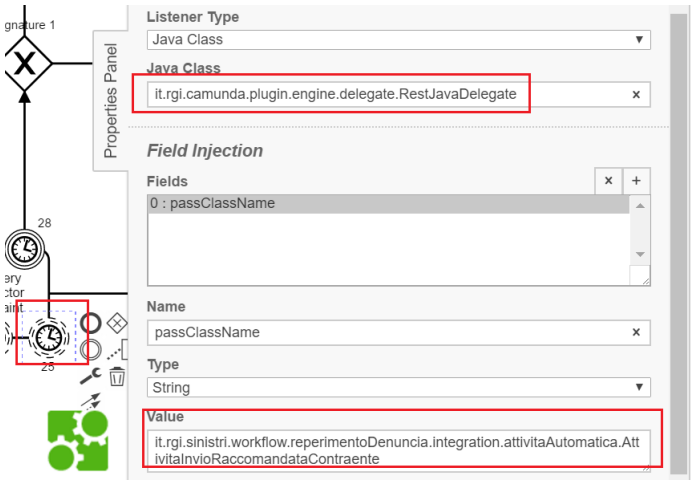


FIGURE 7.21. Timer Non-Interrupting.
Figure reproduced from Camunda Modeler.

In the General tab, they are filled with the same kind of information than the previous one explained. However, it has been added the definition of the delegate class in the Listeners tab and of course the name of the java class containing the logic of the job that must be executed when the timer fires.

7.2.2 Final definition

Additionally to the re definition of tools within each of the processes. It was necessary to solve the problem of data allocation (described previously in the as-is situation (7.1)), by means of the creation and definition of two auxiliary processes.

Alert User In Charge: The fist of the new processes models an **alert** which is shown to the claim handler in charge of an activity, this means that a new task is added to the tasklist of the handler and when the user executes it (by just checking on some information depending on the process, but not operability inside the task) the process finishes. It seems a really simple process, and in fact it is, but it was necessary to inform users, by means of the bpm, that a situation on the claim has occurred. For example when a claim has been closed and therefore not operations are needed anymore on it. The user would then act against the condition.

FIGURE 7.22. Camunda BPM design: Alert User In Charge.
Figure elaborated with Camunda BPMN Modeler

Alert Manager: It has been decided the creation of a new table in the database, this one contains all information regarding process instances active in the system as well as the ones about to start and that have finished in a short-term period. In this way, there will be just one instance of the alert manager active at a time which access to this table to determine actions to follow for each of the tuples. The information contained in this table contains identifiers, claim information, deadlines, liquidators and the state of the process instance; depending on the state of the instance, the manager process checks on the other information and determines the action to follow (delete information related to the process, activate alerts to users or start process executions). This process works as a *spy*, accessing the database containing information about bpm processes and it is active until a property of the system changes. The revision on the table is done every day and actions are taken in that moment cyclically.

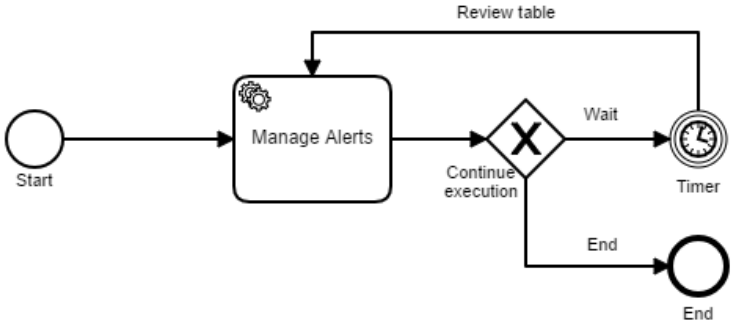


FIGURE 7.23. Camunda BPM design: Alert Manager.
Figure elaborated with Camunda BPMN Modeler

There is presented the new version of each of the processes with the configuration described in the previous subsection and, these contain all the characteristics which, in general, have the intention of searching not for a whole redefinition of the processes (if not necessary), but of its qualities. This means that the important, necessary and significant changes are done and the objective of maintaining the retro compatibility has been a relevant issue.

The final definition aims to solve each of the problems that were discovered during the analysis and presented in the as-is situation (7.1).It is important to highlight that some of the processes do not suffered changes, these remain with the same definition but taking advantage of the standards and all the benefits encountered on the management that Camunda offers and of the new configuration of the system.

Administrative Cover Check

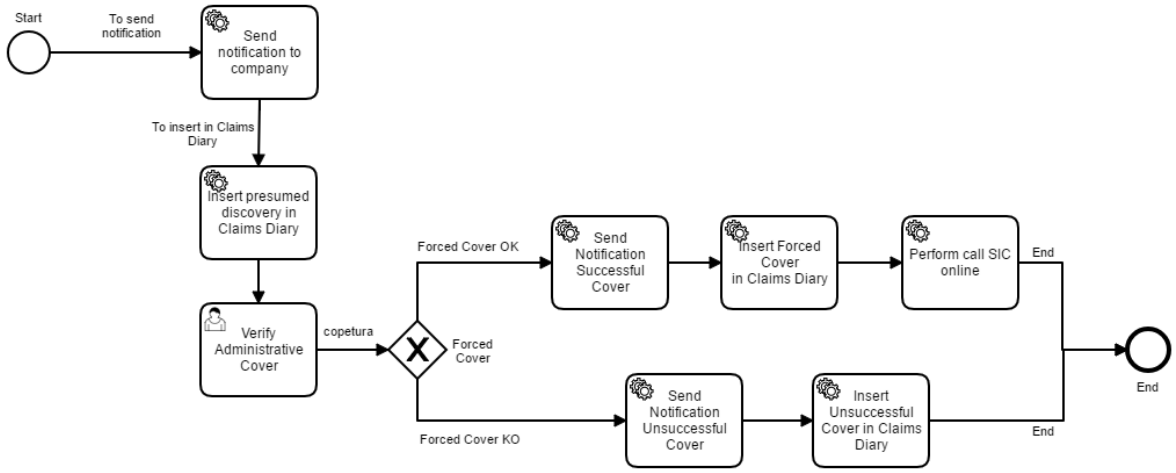


FIGURE 7.24. Camunda BPM design: Administrative Cover Check.
Figure elaborated with Camunda BPMN Modeler

Notify Take In Charge

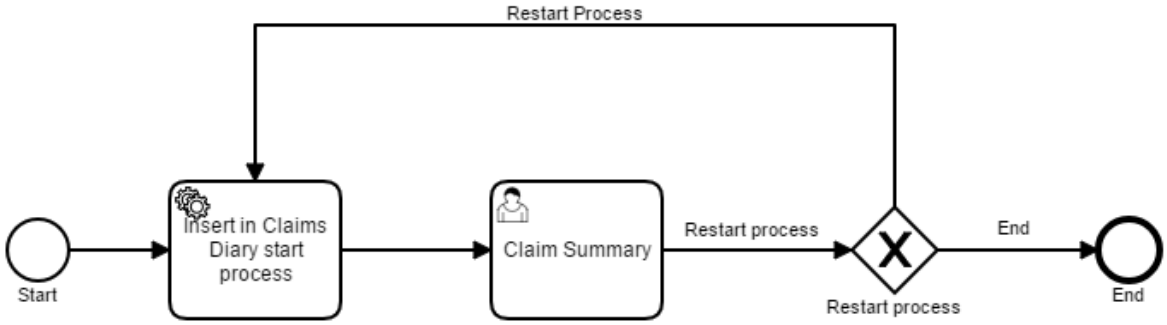


FIGURE 7.25. Camunda BPM design: Notify Take In Charge.
Figure elaborated with Camunda BPMN Modeler

Payment Deadline

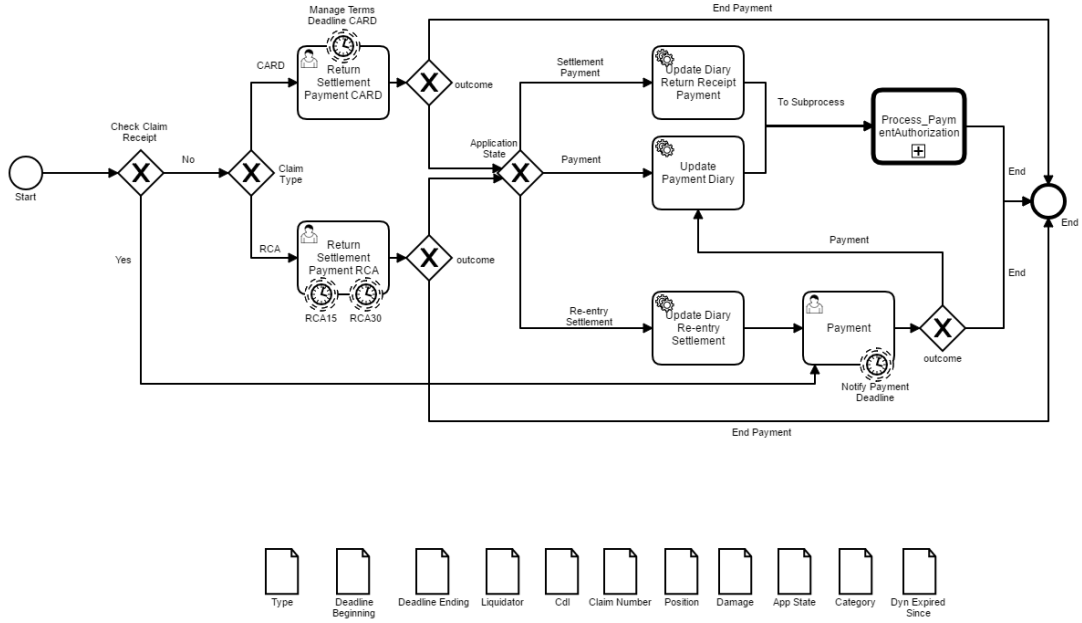


FIGURE 7.26. Camunda BPM design: Payment Deadline.
Figure elaborated with Camunda BPMN Modeler

Position Communication

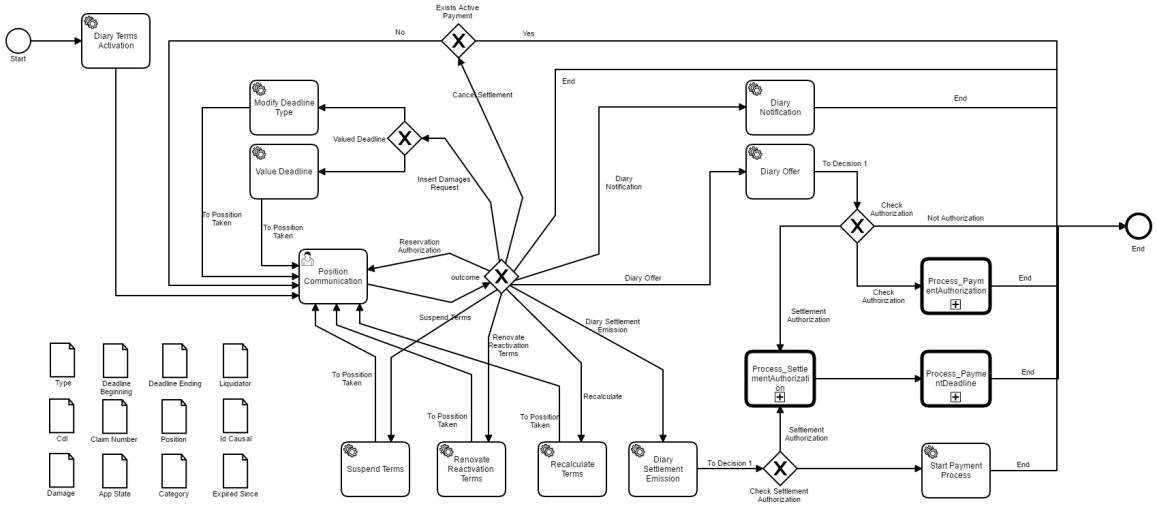


FIGURE 7.27. Camunda BPM design: Position Communication.
Figure elaborated with Camunda BPMN Modeler

Verify Claim Anti-Fraud

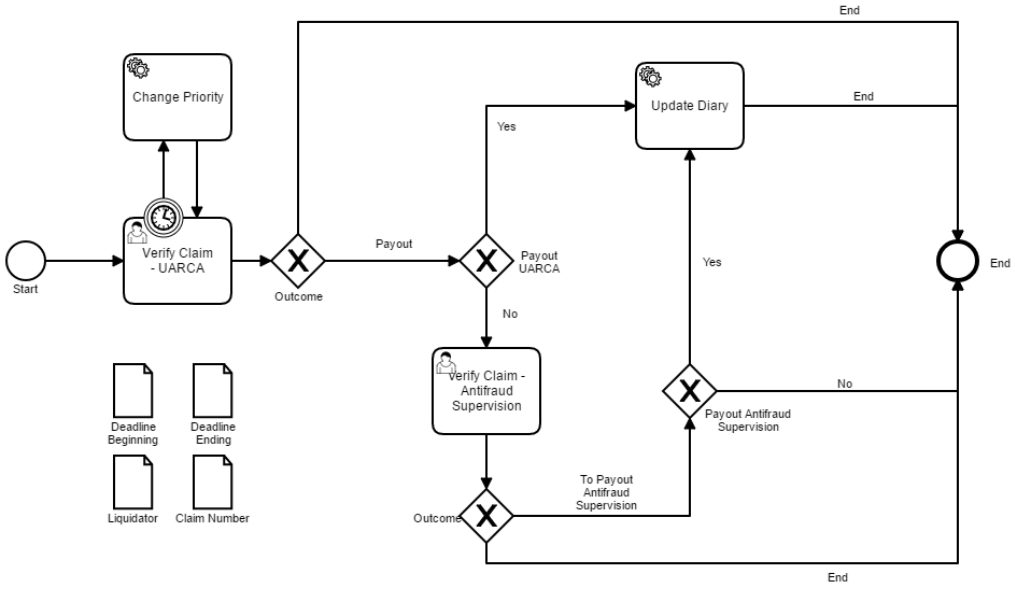


FIGURE 7.28. Camunda BPM design: Verify Claim Anti-Fraud.
Figure elaborated with Camunda BPMN Modeler

Manual Deadline

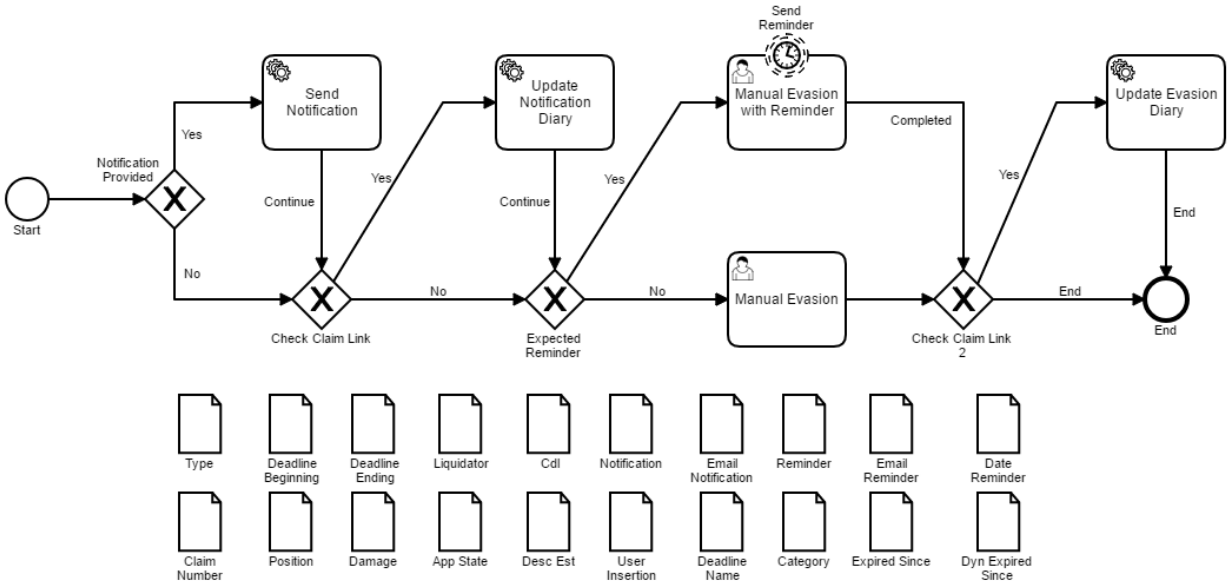


FIGURE 7.29. Camunda BPM design: Manual Deadline.
Figure elaborated with Camunda BPMN Modeler

Possibility Recovery Insured

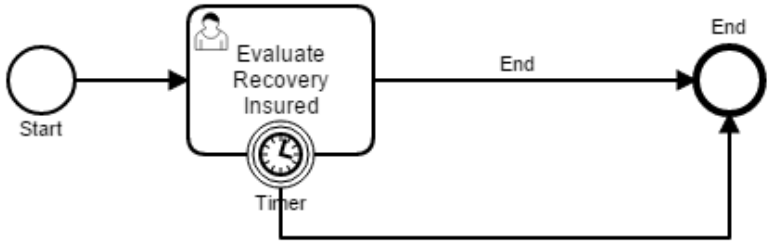


FIGURE 7.30. Camunda BPM design: Possibility Recovery Insured.
Figure elaborated with Camunda BPMN Modeler

Report Potential Claim

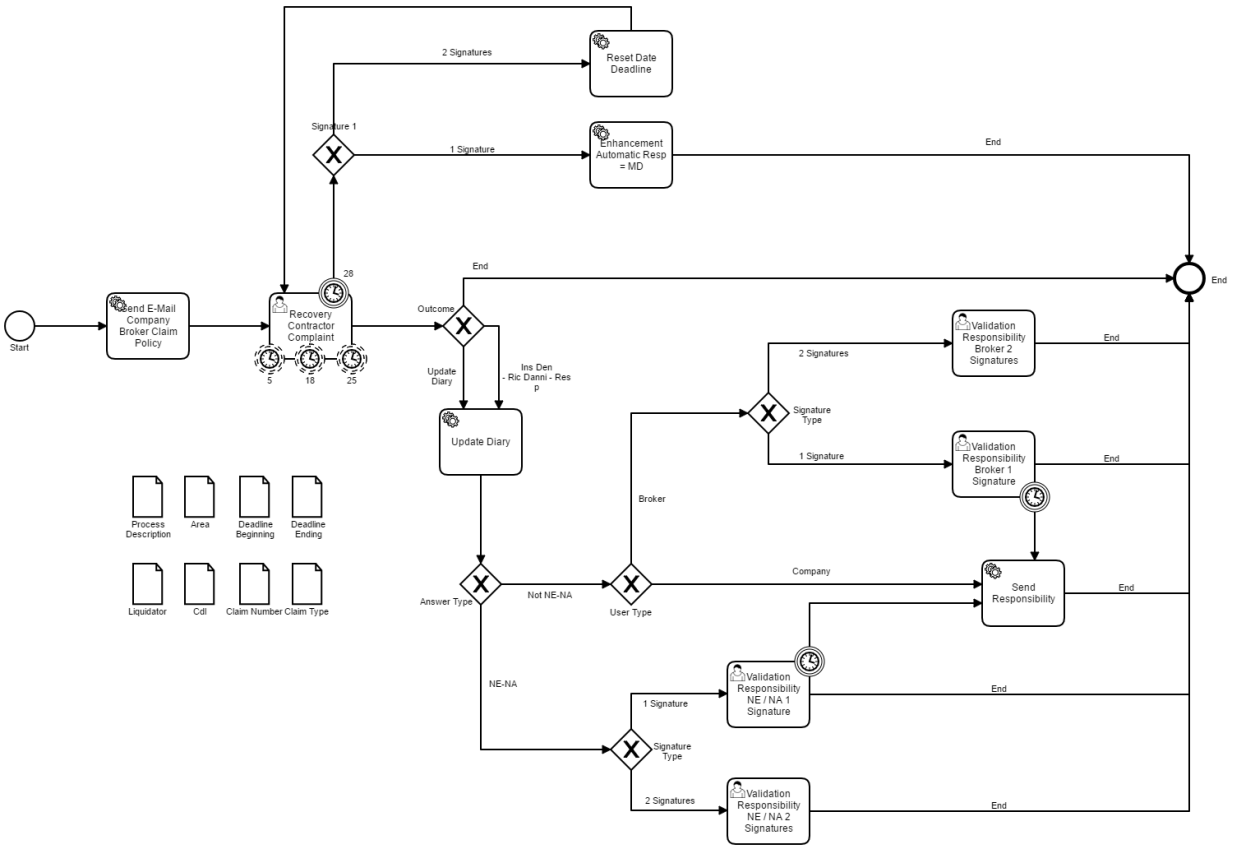


FIGURE 7.31. Camunda BPM design: Report Potential Claim.
Figure elaborated with Camunda BPMN Modeler

Discordant Responsibility Deadline

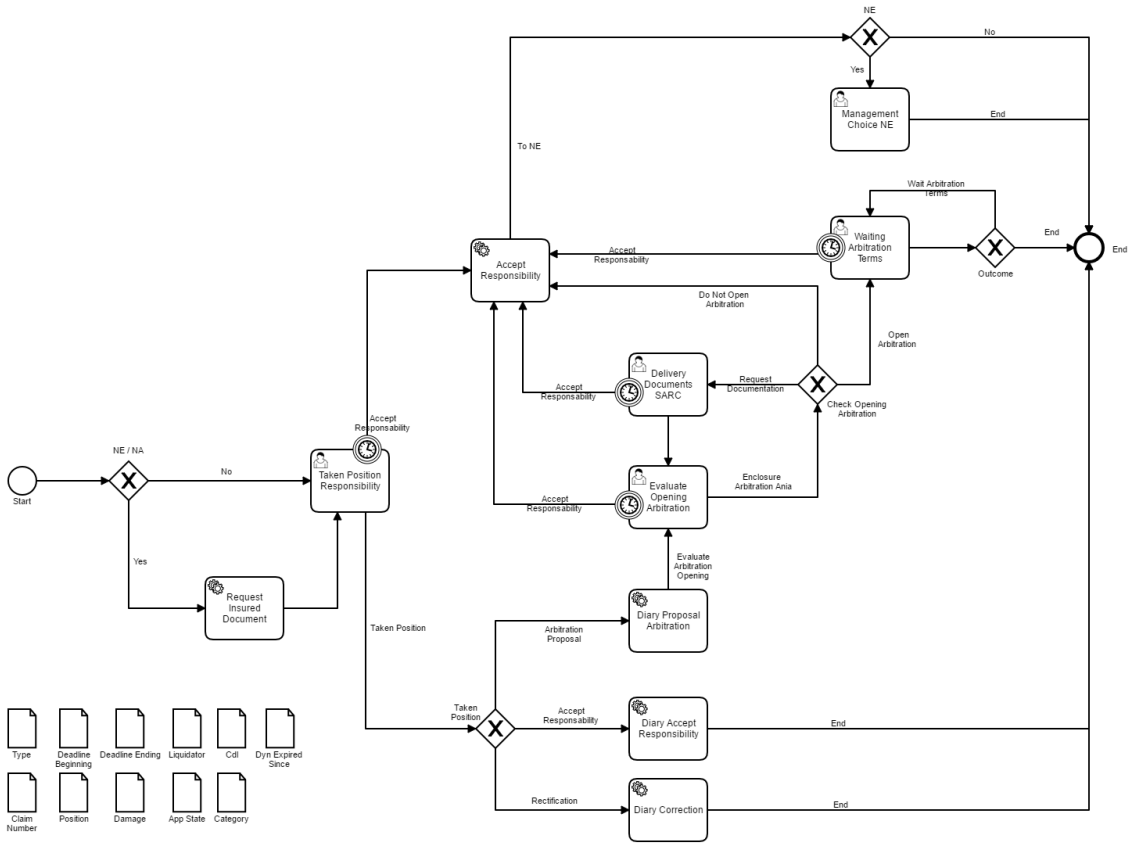


FIGURE 7.32. Camunda BPM design: Discordant Responsibility Deadline.
Figure elaborated with Camunda BPMN Modeler

7.2.3 Testing

For the migration process described during this document, and for each of the involved workflow processes it was necessary to make sure that the redefinition described in the TO-BE situation could be useful for the clients and provide improvements. However, regarding BPM processes, it was not possible to define test cases as with any other software product, because of the nature of the BPM and also because of the lack of time to deliver these processes to the company's clients. The processes of course had to be delivered to any client making sure that the processes worked correctly, not just because they interact with the claims, and as explained in the section (4.2) the claim management represent the most important procedure within an insurance organization; but also because the actual idea of this migration process was to improve and it was necessary to make sure that processes worked as expected.

The solution to this dilemma was based on the idea that the development group of rgi has been interacting with this processes for years,the actual logic of the application did not changed.

Code added or modified regarded just the bpm configuration for camunda, apart from some addition of buttons or changes of the way there were identified time and priority. In resume, there were not highly modified the internal procedures within each of the processes and therefore it resulted easy to identify whether of not the process instances were directed through the flow of information as expected. ***Debugging activities*** took place for every process and the designed were marked as finished and validated until all possible process instances arrived to a successful end point within the process.

Step by step of the processes instances have been analyzed. The normal behaviour of each of the process had to lead to a ***correct termination of the instances***. The *procedure* is described in the following list:

Additionally, and example regarding the **Manual Deadline process (4.5.5)** is shown to illustrate how all of the studied processes should behave in general.

1. Installing the process definition in the system:

   Inside the workflow menu: *Workflow* > *Processes* > *Install Process*. It is necessary to upload a .bpmn file, containing the design of the process.

   A pop-up appears indicating if the process was successfully installed or updated (if a process with the same name is already in the system). If there has been an error, the system shows a page containing a message of the error occurred and the stack-trace related to it. In this way it is possible to find and understand where the error could be within the design. Errors evidenced in the installation of the process mean errors on the design. For example if a gateway flow has not been set with a condition or if the process id has not been set. When errors are located and corrected the process is the same and it is necessary to go to installation call on the workflow menu and repeat.

2. Process management configuration:

   It is necessary, after uploading a process for the first time, to associate the groups and users inside a group to the processes definitions of the system. This allows the user inside that group to interact with the process instances and execute the activities inside them when it is required. To do this, the option on the menu is *Workflow* > *Processes* > *process management, the process name is selected, administration* > *associate groups* then, each of the group names that are to be associated inside the system box, must be dragged to the box of the process groups.

   Inside this section it is possible also to eliminate a process definition inside the system. The process name is selected and the button "Delete process" must be selected. The system informs with a pop-up that the process has been deleted.

3. Start a process:

The starting of a process instance can be done in two different ways. By a normal execution of steps which lead to the launching with all data complete and the state of the system is in accordance with the state that the process expects. In this way, the process is tested as if the real client would be interacting with it and it is the closest to reality.

On the other hand, when the process definition requires to use the Documentary (Legal documents related to a claim within the system), the process cannot be started for testing with its normal previous execution. Therefore, the system allows the starting of a process instance just by setting the business variables which are used by it. In this way the option of the menu to be selected is: *Workflow* > *Processes* > *process management, the process name is selected, administration* > *Start Process* the fields related to the business variables are set as *parameters* indicating the name and the value. After this, the button of Start process is selected.

If the process is started correctly, the system takes the user to the home page of the system, indicating with a pop-up that the process has been started. The different activities are executed according to the flow of execution.

Instead, if the process is not started, the system opens a page containing a message of the error occurred and the stack-trace related to it. These errors can occur because the type of a variable is marked wrongly, values are empty or because a variable which is necessary for the process to start has not been set.

For the example of the Manual Deadline, the starting of the process is done by the normal behaviour of the system. Inside the Workflow menu: *Claims* > *Workflow* > *New deadline*, the system shows what illustrated in the image (7.33) where the fields regarding the deadline to be created are filled. When finishing, the button "Confirm" is selected and the process execution starts (or the page with the stack-trace is shown and debugging actions should take place).

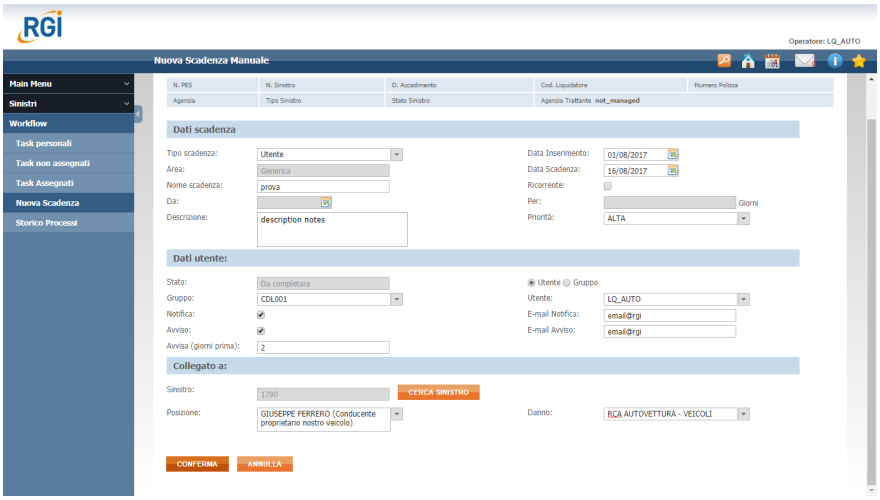


FIGURE 7.33. Example: Manual Deadline. Start step.
Figure reproduce from RGI System web application

4. Execute a process: When the starting of a process is done, each of the activities/tasks (6.3.1.2) are executed, in order and according the flow of execution defined, having into account decision variables to choose paths. When going on within the process instance, the system runs the Automatic Tasks linking the defined java classes, links activities between them by passing the corresponding values of variables and by checking conditions. If errors arise during the execution, the system opens a page with a named error, showing the stack-trace corresponding to it to perform the corresponding debugging actions.

   From the testing point of view, all process paths have to be considered.

Code di lavoro personali

Cerca

Gruppo	Area	Processo			
Tutti			2	61	3
MOTOR GROUP (CDLRGI_AU)			0	61	3
	GESTIONE SINISTRO (SX_MANAGE)		0	3	0
		SettlementAuthorization	0	2	0
		ReserveAuthorization	0	1	0
	OPEN CLAIM (SX_OPEN)		0	58	3
		PositionCommunication	0	0	3
		NotifyTakeInCharge	0	58	0
CDL001 (CDL001)			2	0	0
	MANUAL DEADLINE (SX_MANUALDEADLINE)		2	0	0
		ManualDeadline	2	0	0

FIGURE 7.34. Example: Manual Deadline. Tasklist.
Figure reproduce from RGI System web application

If the process requires of a user intervention, the system executes the *To Pass* method of

the .java class linked to the manual activity so all fields and information required in the Form are filled. Then, as shown of the figure (7.34), the system adds an User Task inside the queue of the handler called LQ_Auto, whom belongs to the group CDL001. And at this point, the user can perform the actions allowed according to its profile Figure (7.35), these could mean the transfer to the group, check the point inside the process design or execute the activity.

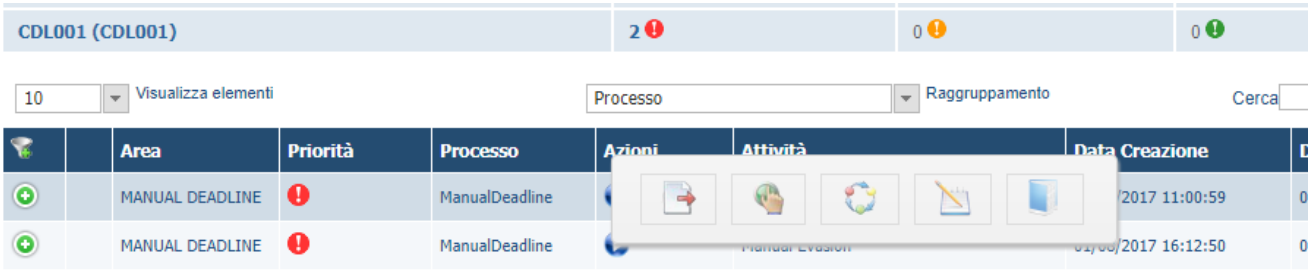


FIGURE 7.35. Example: Manual Deadline Tasks.
Figure reproduce from RGI System web application

5. Manual/User intervention:

Within the manual intervention of a user with a process instance, there are two main functionalities that are important to validate, they must work correctly. The fist one is the availability of a user to check the state of the process instance within the design, as shown in the Figure (7.36), this is to make sure that the process is located at a expected point and the user can make sure that the activity to be carried corresponds to him and with this information he can take actions on the instance before actually executing the task.

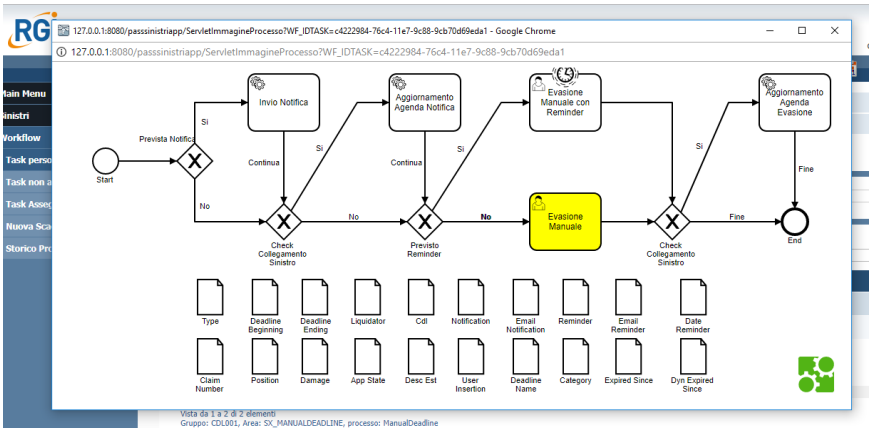


FIGURE 7.36. Example: Manual Deadline Check state on graph.
Figure reproduce from RGI System web application

The execution of the manual task represents the step in which the user takes place on the actions that are required by him to allow the process to continue, this can mean any action on a claim or deadline, check statuses, upload documents, add any kind of information, etc. When the user finishes the completion of the activity, the system executes the *To Workflow* method of the .java class linked to the manual activity, in this way all fields and information provided by the user are saved into memory or used.

The Figure (7.37) shows the action performed by the user when executing the *Manual Evasion* activity of the Manual Deadline process. Here the user completes the deadline with a description that then will be saved into the Agenda.

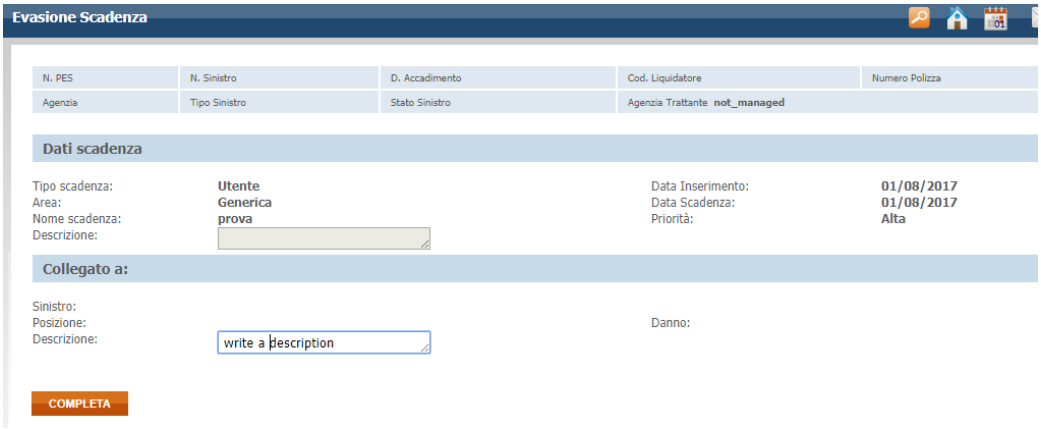


FIGURE 7.37. Example: Execute manual task.
Figure reproduce from RGI System web application

6. End process:

The ending of the process requires that the instance definition arrives to a final event. When this happens no more tasks are executed and the system takes back the user to his list of tasks, as shown in the Figure (7.38), the counters on the queues must have been decreased. If the process instance does not arrives to a final state, errors have occurred during its execution and therefore the system shows the message error together with the stack-trace, at this point debugging actions must take place.

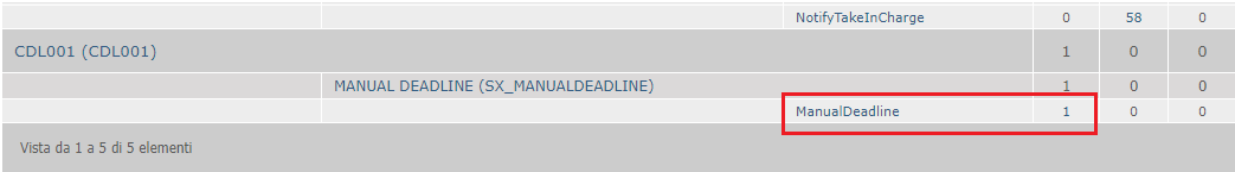


FIGURE 7.38. Example: Manual Deadline Tasklist after execution.
Figure reproduce from RGI System web application

7. Monitoring:

   The control of the process instances can be done with the Cockpit BPM (6.4), where the states of all the instances can be seeing at the same time and, each of them can be modified for testing, just by changing single business variables inside it.

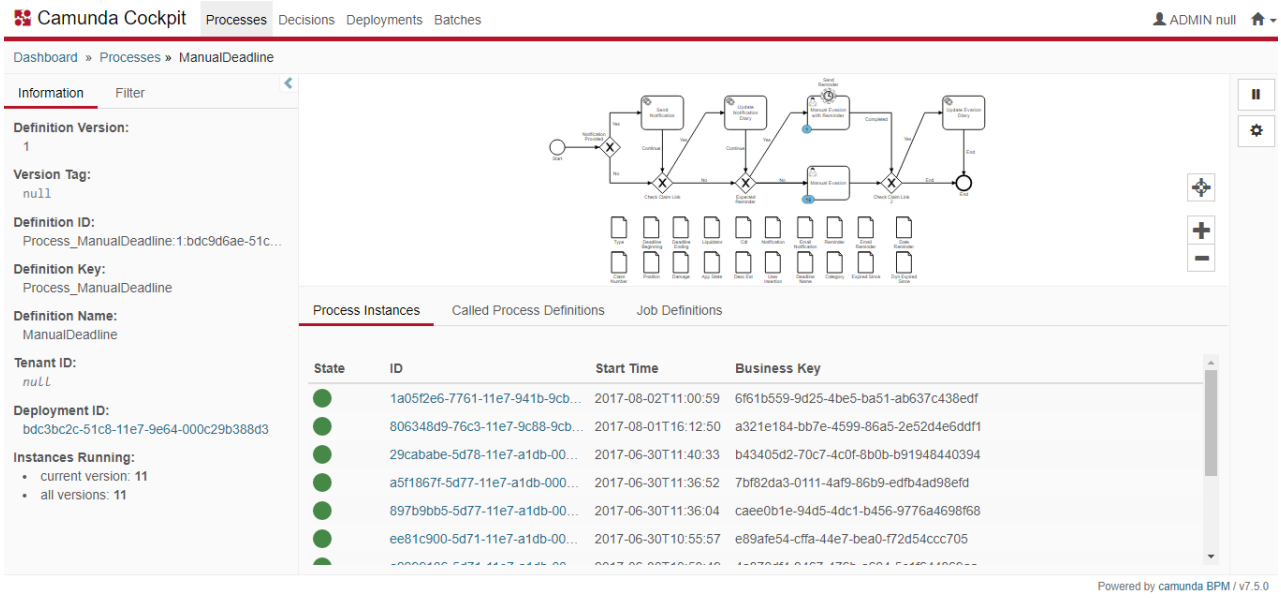


FIGURE 7.39. Example: Cockpit Manual Deadline.
Figure reproduce from Cockpit BPM System web application for RGI

The Cockpit contains all the instances of the processes of RGI that are installed in Pass_Claims system, when selecting any of them it is possible to control it and access its information to monitor. Following the example described during this section, regarding the Manual Deadline Process, the Figure (7.39) illustrates all content inside the application that regards this process, instances are listed and the diagram shows where in the flow of execution, those instances are located. By accessing any of them it is possible to access business variables, restart it, delete it or stop it.

7.2.4 Partial conclusion

The solution illustrated during the To-Be situation evidences the advantages of using new technologies and to be open to change. The workflow management that the company is implementing corresponds to an organized and conscious arrangement that goes according with the company's growth and expectations.

Having separate application servers for the logic of the system and for the bpm represents advance in the way that it provides organization and segmentation within the company depart-

ments which allows specialization and therefore better results and work. At the same time, the using of different databases provides availability

At the end, the implementation of the Camunda BPM solution did not required a complete re organization of the company's processes and the redesign just involved the addition or modification of java classes, xml and bpmn files; also because the Camunda BPM considers as main idea, the easy implementation and understanding of workflow processes by all the components of an organization.

The redesign activities that took place considered the improvement of the different aspects found as problematic in the As-Is situation. The design of each of the processes gives a sensation of being modern and updated. Priority and time management suffered crucial changes, however always having into account the retro-compatibility of the system. The necessity of finishing activities when the restarting of timers or the re-calculation of priorities took place, are no longer necessary given that Camunda provides the feature of non-interrupting events within activities. Delegation principles where inserted for the implementation of events, timers and gateways within the several processes. And of course, the multi language feature on pass_claims was incorporated to support the opening of the markets of the company, abroad.

Chapter 8

Conclusions

Along this chapter there is presented a general conclusion (8.1) of the analysis and implementation on the migration process of the company RGI Group, in accordance with the objectives planned at the beginning, as well as the considerations that took part during the development of the process. Moreover, there are evidenced some aspects driven to future implementations on the BPM of the company (8.2).

8.1 General conclusion

To assure success in the intensely competitive insurance market, history has taught us that the implementation of changes and the introduction of new technologies are a key instrument that needs to be considered within a company. it is necessary first to detect and analyze problems and recognize which areas represent the most urgent aspects to be improved. Differentiation trough innovative technologies like BPM, by automating business process helps to achieve better efficiency, effectiveness and business decisions; in an insurance domain company, these concepts can be applied on the management of *claims* which represents the most important unit on the business, related to maintain or increase the market profitability.

The process was driven within the company RGI Group, an Italian software vendor which concentrates its efforts on the development of products to provide solutions to the insurance sector. The analysis was concentrated on the redesign of eight of the workflow processes (automated business processes) inside the company and, more specifically, from the ones carried out by the *Claims department*, making part of the PASS_CLAIMS product. These workflow processes define a set of procedural rules and activities which sometimes require the intervention of several claim handlers and working groups. The main idea was to migrate these processes from the JBPM definition that RGI had been using for many years, to the Camunda BPM, which represents a complete and modern engine for the management of claims.

Conclusions on the past situation of the BPM of the company have taken place, each of the process had to be analyzed to make sure that its characteristics still correspond to configuration

which is expected by the company, the clients and Italian regulations. As a result, it can be highlighted that the biggest problems in the design are related to deadlines management, priority management, aspect of the graphical representation, data allocation and multi-language availability.

The advantages on the implementation of Camunda BPM solve these complications. The design of each of the processes is made and has become functional, with the new implementation it is modelled a system in which the actual logic is located in a different application server than the from the logic behind the BPM. From now on, the company can trust in Camunda for the technological updates related to the claims workflow, this is because now, updated and changes will be managed by Camunda org, in contrast with the JBPM solution, in which updates had to be carried out by the development team of the company. The solution illustrated evidences the advantages of using new technologies and to be open to change.

The workflow management that the company has acquired after this process, corresponds to an organized and conscious arrangement that goes according with the company's growth and expectations. Advance is ensured, organization and segmentation within the company employees provides specialization of tasks and therefore better results on their work, availability of the system BPM is improved, by means of the data allocation design decision and the easy implementation and better understanding of workflow processes by all the components of the organization, modern design of the processes, priority and time management problems found with the last implementation were solved, And the multi language feature on pass_claims was incorporated to support the opening of the markets of the company.

The presented table (8.1) summarizes the aspects that have been improved:

Characteristic	Annotations
Timer management	Implementing the Camunda BPM solution, enables the possibility of managing dates and deadlines by means of the implementation of the standard BPMN2.0, which includes the Timer components, which can be placed in the design as an intermediate event and also can be attached to any kind of activity, this means that, in comparison with the As-Is situation, there is not anymore the necessity of creating batch activities or additional outsider processes to handle the situation in which an activity needs more than one timer at a time. Also, timer objects can be set as non-interrupting which gives the possibility to an activity, to continue its execution even if the timer fires. In order to allow the retro compatibility, it was created the class *Workflow-TimerService* which checks on the properties of the systems and by means of the method *getTimer()* returns the corresponding String that must be set for the bpm engine. For the camunda solution it returns a date in the format corresponding to the Standard ISO_8601.

Priority management	In order to help claim handlers, the system keeps the functionality of organizing tasks by means of their priorities. Camunda BPM sets in each activity inside a process, a number between 0 to 90 to define the priority of a task (0 = low, 50 = intermediate, 99 = high), in this way when a user access its tasklist it can have the recap of the tasks, summarized by means of this values, in order to attend the most urgent activities. This feature lowers the probability of missing deadlines and organizes work so productivity increases. As event objects attached to activities do not cancel the task when firing, it is not necessary to create additional task to modify priority and recreate activities, something which make more complex the design (as with the JBPM solution). Camunda BPM allows to add logic to non-interrupting timers and in this way priority can be modified without launching activities again.
Design	Diagrams designed with Camunda Modeler not just covers and considers all elements necessary to make process instance work properly, but it also provides an updated environment which may provide to designs the idea of modern and could attract clients in the way that represents the company's interest of being updated with new technologies and open to positive changes.
Data allocation	Two application server are used by the system, one allocating the actual logic of the pass_claims system and the other one holding the BPM and Camunda engine components. These application servers communicate with each other by means of HTTP requests and each of them makes use of a different database, this provides improvements on performance and efficiency. To lower the probabilities of holding information that regards processes that have been into memory for many years (because of Italian regulations changes, repeated procedures on claims inside the system or deadlines entered wrongly), it has been designed an additional process called *Alert Manager* which controls a particular table containing running instances of processes, form the Camunda Database, and which creates manual activities (instantiates the *Alert User In Charge* process) into the tasklist of the claim handlers related to them.
Language	The implementation of the bpm with Camunda BPM, makes use of the advanced properties of the Camunda Modeler to incorporate the multi language feature into the system. By now, the environment of the system can be set in Italian, French, Spanish and German and therefore also its BPM actions related to it, including the process diagrams and manual activities.
Monitoring	Camunda offers the possibility of using the web application called *Cockpit BPM* to control and monitor the process instances that have been installed into the system. It provides an environment in which, for each instance, it is possible to review statistics, analyze states, stop, restart and end executions, as well as the possibility to resume in just one place all information related to the workflow processes.

Future	As the BPM is now seen as a separate component into the system, which interact with the components that hold the logic; future changes or maybe another migration process will be easier given that it wont be necessary to analyze logic inside each of the processes, the claim management is now carried out on Camunda BPM and given that it is developed by the Camunda org. and not by RGI Group, the maintainability is assured and probably future technological improvements will be considered. As the Roadmap of Camunda guarantees new characteristics are to be considered and implemented and RGI can take advantage of them, to offer them as a value to the product to its clients.

Table 8.1: Summary of improvements.

At the end, advantages were found on the Camunda BPM implementation, processes designs did not change in big proportions. However, the management of the claims has experienced considerable changes, in the way of making the company's product a more attractive towards clients, giving importance also to the fact that the management of these processes will keep suffering positive improvements in time.

8.2 Recommendations and Future work

According to the experience acquired during the development of this process, and the knowledge collected about the company and its system in general. Some future considerations are to take into account, these are:

- The development and implementation of BPM systems must be associated to a plan or policy of the company, for the continuous improvement in the processes covered by the system. In this way, it can be ensured that such a system is not treated as a common classical implementation without exploiting the benefits that it could bring to a BPM system.
- The benefits found during the analysis could be applied to other products offered by RGI and not just for the Claim management, even if the Claims represent one of the most important units within an insurance company, BPM advantages can be implemented in other areas as well.
- At some point in time, the retro-compatibility of the system wont be necessary anymore, the system should be again analyzed and changes will need to be done, in this way, unnecessary resources and procedures could be avoided.

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