Improving Employee Life-Cycle Processes Support by using a Web-Enabled Workflow System: An Agile Approach

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Abstract. Employee life-cycle processes management (hiring new employees, changing their conditions, and dismissing them) is a critical task that has a big impact in HR Information Systems. If these processes are not handled correctly the consistency of HR databases is compromised. In many cases (especially in small and mid-size business) these processes are implemented using semi-manual procedures based on unstructured information. In this paper we will present the results of our real-world experience building a web-enabled workflow system for managing employee life-cycle process instances in the context big Spanish telecommunications company.

1 Introduction

Employee life-cycle management is a critical task that affects all companies without regard of their size and business. These processes include hiring new employees, changing working conditions (promotion, demotions, change of cost centre, changes in the compensation package, change of function, change of organizational unit, etc.) and dismissals (end of relationship). In this paper we will present our real-world experience building a web-enabled workflow system for managing employee life-cycle process instances in a big Spanish telecommunications company. In the first section we will present ONO, our company, in order to set the organizational context. In the second section we will present the problem that we faced and set the requirements for building a tool to solve it. In the third section the web-enabled workflow system is presented, making special focus on the agile approach used to build it and how the previously stated requirements are met. Finally we will offer some conclusions and future lines of work.

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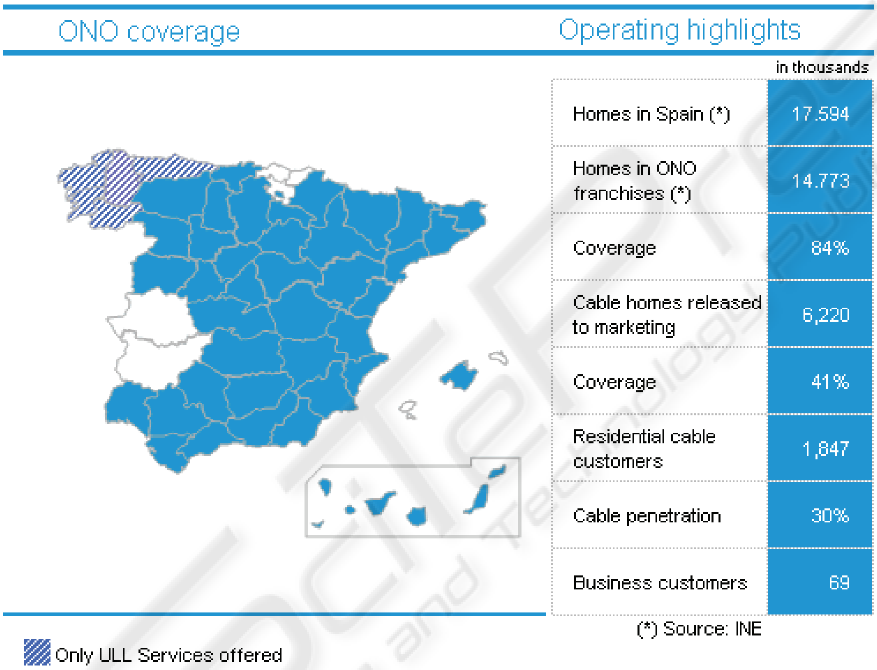
1.1 About ONO

ONO is the leading alternative provider of telecommunications, broadband Internet and pay television services in Spain and the only cable operator with national coverage. ONO offers its services to more than 1.8 million residential cable access and 69,000 business customers as of 31 March 2007, through its own state of the art networks which give direct access to nearly six million homes in franchises that cover the majority of Spain, including the nine largest cities. ONO is the principal competitor to the incumbent telecommunications and pay television operators in Spain. For the first Quarter 2007, ONO generated revenues of €1,608 million and EBITDA of €592 million, on an annualized basis. ONO has several offices all around Spain.



Operating highlights

in thousands

Homes in Spain (*)	17.594
Homes in ONO franchises (*)	14.773
Coverage	84%
Cable homes released to marketing	6,220
Coverage	41%
Residential cable customers	1,847
Cable penetration	30%
Business customers	69

(*) Source: INE

Fig. 1. ONO Spanish coverage and operating highlights. ONO offers their services to clients in almost all the national territory, covering more than 17.500 homes in Spain (according the Spanish INE).

2 The Problem

In the last years, ONO experienced a very fast growth in a very short period of time. The biggest leap was the merge with Auna (a company that had the same size than ONO at the time of the joint). One of ONO's main characteristics was being very agile, with very simple and human-centred processes. Some of them didn't scale to the new context of the company, since they were designed and implemented having another model of enterprise in mind. The employee life-cycle management support processes (hiring, changing working conditions, and dismissal) fell in this group.

Each of these processes were based on paper-printed documents (that in the best case where based in corporate Excel templates), with all the problems that this implies including inconsistency in the input (files were completed differently by the requestors), traceability (all the Excels were sent internal mail), problems for enabling team-work (there wasn't any mechanism for dispatching the requests and therefore a single request could be handled incorrectly by several HR (Human Resources) employees at the same time), lack of a unified way for notifying the participants in the flow, lack of tools for reusing the requests, lack of reporting (there wasn't any automatic way to get a report of what was going on in the company), lot of human effort of very low added-value (HR managers consolidating hundreds of Excel files and e-mails), among other problems. To make things worst, ONO has a region-based organizational model (based on the division of the company in the Spanish geography), increasing the impact of the above mentioned problems.

2.1 Description of the Manual Processes

ONO is a young company, and therefore some of their processes matured in the last years and some of them are still maturing. The employee life-cycle management process was a manual process that was based in interactions among people that knew each other (at least by telephone). They were manual workflows where all the participants worked collaboratively on a physical paper document.

Following, we will describe briefly (and in a broad way) how the processes were run:

1. A user creates a request document (for staring a new hire, a change in the conditions of one of his employees, or a dismissal). In the best cases this document was based on a corporate template. While this was the best case, it was far from being ideal: since the requestors weren't HR specialist (a petitioner could be any manager that needs to hire a new employee or to promote one of his employees) usually the document wasn't correctly fulfilled.
2. After the document was created and printed, it was signed by the petitioner and by her manager.
3. The petitioner notifies the HR department (by email or by phone) and then he sends the physical document by internal mail.
4. HR receives the document and validates it. If they need further clarification, they would contact the petitioner or her manager to discuss about the request.
5. In the case that the conditions of the hiring / promotion / change / etc. varied significantly after the discussion, a new physical document needed to be issued and signed again.
6. HR registers the transaction, contacts the employee that would be hired / promoted / fired / etc., does their usual tasks according the type of process, and registers all the information in their HR systems (payroll, SAP HR module, etc.)
7. Periodically (twice a month), the HR staff manually created reports of the ongoing processes to inform the upper management. They also used this infor-

mation to verify that the HR budget wasn't overrun (this verification was also manual on a process-by-process basis).

The above description is a simplified version of the manual processes, with the goal to illustrate its fragility. It was very error prone, produced lots of unnecessary work, unreliable (in some cases, papers where lost and the process needed to be started over), and unique for each petitioner (according to her personality). It consumed lots of time of the HR team performing tasks of near-to-null value, such as verifying the input data and trying to interpret it, creating reports manually, tracking papers, notifying personally each of the actors in the process, and controlling the budget.

2.2 ONO-AUNA Merge Related Problems

The process mentioned above worked fairly well in mid-to-low-size environment (less than 2.500 employees), with a relatively small HR department, and a very people oriented culture. Since the process was mainly based in human interactions, it worked better when the participants knew each other. Additionally, each instance of the process was highly dependant in the actors: some requesters (hiring managers in the hundreds of departments of the organization) where good "process players" and sent the information in good shape while others where very chaotic.

When ONO bought Auna and the merge started the company doubled its size. A manual process mainly based in interactions among people that knew each other didn't scale well in the new scenario, in one part because the size of the company increased but mainly because the people running the process didn't knew all their counterparts anymore (and given the new size of the company, it was very improbable that they would do ever).

To worsen things, the amount of HR transactions regarding employee life-cycle increased exponentially: is well known by everyone that in a merge process lots of new people come to the company, lots of people leave the company, and even more people changes position (in the average, there are two employees for each position, since both companies where in the same business).

A final added problem was traceability and auditability: since the process was based in physical paper sheets, it was mandatory to keep the original papers for a time period according with the Spanish law. During the merge, lots of work centre moves were done. Each move affected the paper files and therefore increased the difficulty to locate the papers (they could be lost or at any branch of the company). In these cases, lots of time of the HR was lost just doing "paper chasing".

2.3 The Need for a Tool

It was very clear that the company needed a tool to assist the employee life-cycle management, with the goal of making it easier, more reliable, predictable and auditable, to provide all the participants in the process the information they need just in time without any further hassle, and to provide the upper management with reporting tools to know the global picture regarding the overall HR budget of the company.

After jointly studying the problem ONO's HR and IT departments decided to build a set of tools to support the employee life-cycle processes. The main goal of these tools was to enable the collaborative work between all the actors implied in each of the employee life-cycle management processes. Each of these actors should be able to interact with the new tool in a very simple and efficient manner. Additionally, the tool should be proactive, providing a "push model": each participant in the process should be notified whenever a process instance requires his participation. The tool should support the approval workflow [13] for each type of process, dynamic headcount validation and automatic reporting.

2.4 Requirements for the Tool

The following requirements where established by ONO's HR department:

- *HR Budget Control*. Provide an automatic control of the HR budget at all the appropriate levels. For example, when a new request is issued it should be checked against the requesting department HR budget to verify if the request is valid. At a higher level the upper management and HR directors need to have reporting facilities to have a general view of evolution the overall HR budget of the company.
- *Support for the Approval Workflows*. Model the manual processes using a workflow systems. This implies modelling semi-formal processes using formal specifications.
- *Enabling Collaborative Work.* The tool should allow each employee to participate in the approval workflow at the right moment. It should inform the participant in the flow of the new events that require their attention. It should also give a unique single point for checking the status of the on going processes (eliminating e-mail and phone).
- *Automatic Reporting.* Generate all the reports automatically, without manual intervention.
- *Traceability and Auditability.* All the process instances should be traceable and auditable, giving a fine grained control over the past events.
- *Reducing Manual Work.* reduce all the low value added manual work
- *Input Consistency*: simplify data input in order to give reduce ambiguity and improve consistency in data that enters to the approval flow.
- *Reduce Bottlenecks in the Process.* Provide tools to avoid a single person to stop all the ongoing flows when she is not available.
- *Ease of use and Far Reach.* Create a very easy to use tool in order to make the learning curve as low as possible. It should also accessible by any employee of the organization without the need of any complex setup in his computer.

3 A Web-Enabled Workflow System as a Response to the Problem

After the problem was clearly established ONO's IT and HR departments started working on how to deliver a cost and time effective solution following ONO's cultural principles [4]. The working group determined that the best approach for solving the problem was building a web-enabled workflow-based system, since it would empower the collaborative work on the employee life-cycle requests without any special requirement in the client computers.

The group also decided to build it with a low budget without sacrificing the quality and functionality, using the technologies and tools available at the company (mainly based in the development framework created by ONO's IT department). An agile approach was the methodological choice since it allowed to build small deliverables in short iterations, delivering value in small (but continuous) slots of time. In the economic side, this approach would allow to build with the resources at disposal: if the team was short on economic resources, it could do less ambitious iterations or even do no iteration without affecting the overall project (whenever any iteration was finished a new fully working module was delivered and deployed in production).

3.1 Modelling the Business Processes

The processes were modelled after a careful analysis of their manual counterparts. A joint work between ONO's HR and IT department was performed in order to come out with the most accurate representation of the business processes involved in the employee life-cycle.

The business process modelling was a very important part of the process: lot of tacit organizational knowledge [10] needed to be transformed in explicit knowledge [10] that can be used as a formal specification. It was a big challenge to come out with a model that clearly represents the interactions for each employee life-cycle process: since the process was semi-formal, there where significant ambiguities that needed to be resolved.

The main premise in this specification process was *simplicity*: our goal was to come out with the simplest process definition as possible. All the resulting flows are very similar: this is the result of a commonality analysis [6] between all the processes in order to find all the similarities between processes and model them as uniform as possible to make them simpler and easier.

Observing, Learning Building, and Delivering: An Agile Approach for Modelling the Business Processes. We took an agile [1] [8] [2] [11] approach built our first model iteratively and incrementally: instead of trying to come out with the final version of the three flows up-front we went through several short iterations on the first one (the hiring process) and improved it using the feedback and experience gained from its real users.

We created a simple implementation of the hiring process according to the more immediate needs of HR. When it was in production we actively observed the problems and situations that arose to our users when using the tool and the error logs of the system. With all this information we built packages of fixes (in short sprints) and delivered new versions taking the same approach (observing, learning, building, and delivering).

This approach allowed us to constantly deliver value and to supply a working solution to our users without spending unnecessary time in the analysis phase (lot of the changes that we included in the packages where product of our continuous improvement process).

3.2 An Agile Approach for Implementing the HR Workflow System

The Software Development area in ONO's IT department works under the principle of dividing big projects in small chunks in order to deliver functionality earlier in shorter intervals of time and with more client checkpoints. This allows building applications with smaller budget, deliver early working products to the clients, and giving them the chance to change or add new requirements after each iteration. The main goal of our approach is to deliver value to clients in the shortest interval as possible and to evolve the functionalities based on real world information mined from the usage of the application (observe, learn, build, and deliver).

ONO's Software Development area uses a variant of SCRUM [11]. Each sprint [11] starts with the creation of a scope document that is validated by IT and its clients (in this case, HR). After the document is approved, a high level architecture and high level designs are built and a product backlog is created. This backlog may also contain small user stories on each of its items. The backlog is revised on a daily basis doing stand-up meetings. In that stand-up meetings, some architectural or design issues may arise. In that case they are discussed later in other special purpose meetings, in order to make the daily stand ups as short as possible and not keeping all the members of the team busy with things that are not interesting for them. In our SCRUM variant, the sprints are not of a fixed size and we have an architect role to ensure conceptual integrity [3] and alignment and synergies with Ono.CDI, our corporate software development framework.

We calculate the size of the sprint according to the commitments established with the clients. However, we always work actively with the clients to keep the sprints shorter than six weeks. Ideally, and on the average, the sprints have three weeks duration.

After sprint is finished, a User Acceptance Test (UAT) with the client area is performed. In this test some minor issues may arise, so we always plan some days in our schedule to fix these minor issues. After the UAT is passed and the fixes are approved we deliver the product of the iteration.

Deliverables Planning: Technology for the Masses. HR and IT established to policy of "*Deliver value to 4980 employees first and later to the remaining 20*". This was our guiding metaphor [10] [2] and means that we work to deliver functionality to all the company first (the front-end of the application) and leave the detailed back-end operations for later iterations.

The following example illustrates the idea: we focused on creating client applications with very clear and crisp user interfaces to deliver good tools to all the employees in the company for going through the employee life-cycle processes. This eliminated the physical sheet of paper, the phone calls, and the ambiguities in the process, improving the operations of all the hiring managers and organizational unit managers in the company (and potentially of any employee in the company). However, in the first versions the back-end tools for the HR team where less sophisticated since we used all our resources for providing value to the biggest number of users.

Technology Planning. In order to create a reliable and fully functional tool with a low budget and fast delivery we leveraged Ono.CDI (Ono Content Driven Infrastructure Framework), our corporate software development framework for intranet based applications. Ono.CDI contains a set of tools and engines that provide core and basic services (figure 2) that includes a Workflow Engine, Document Management Engine, Business Request Framework, and Caching Engine [14] [15]. It has crosscutting Security and Audit modules that ensure that applications complain with ONO's IT security policies and with legal audit requirements.

Ono.CDI also includes prescriptive architectural guidelines and blueprints that govern the architecture of ONO's intranet applications. Therefore the application is completely aligned with ONO's development policies lowering its technology transfer and maintenance cost (the maintenance and the development team are formed by different people) and ensuring a quality minimum based proven architectural patterns [5] [6] and development practices.

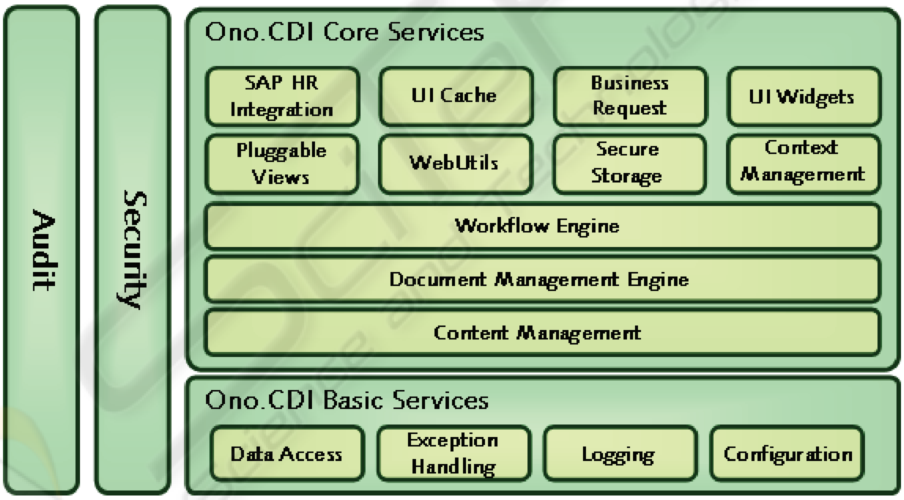
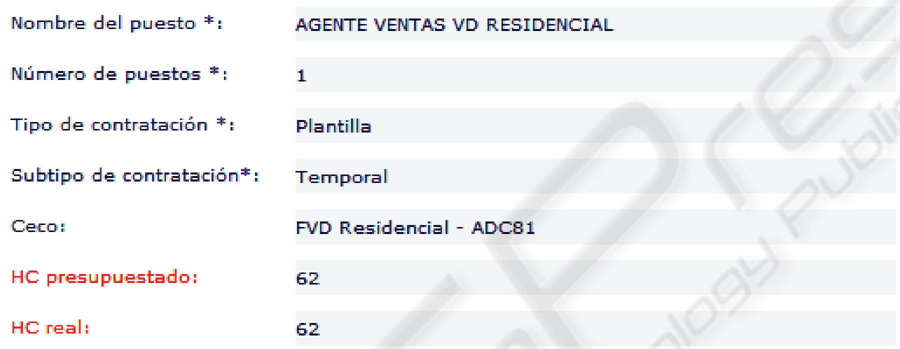


Fig. 2. ONO's development framework high level architectural view.

3.3 HR Workflow System

The result of the process is the HR Workflow System that provides support for the employee life-cycle management processes. In the section 2.4 we established a set of requirements that needed to be fulfilled by the system. Following, we will explain how these requirements have been met by the tool.

HR Budget Control. The system provides a detailed HR budget control. It has been designed and built to keep track of the budget of each organizational unit on a process instance basis. For example, when a manager requests HR to hire a new employee the system checks if his area is above or below its headcount budget. If the area is above its headcount budget the request is annotated with special information (as shown in figure 3) in order to make this situation easily noticeable to the rest of the participants in the flow. The application also includes reports to provide the HR experts and the upper management with high level real-time views of the overall HR budget evolution in the organization.

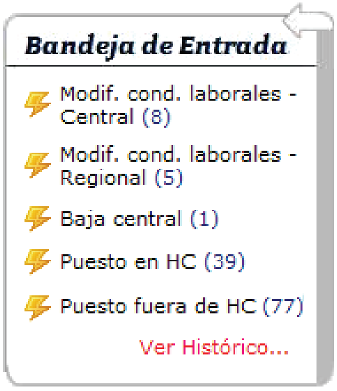


Nombre del puesto *:	AGENTE VENTAS VD RESIDENCIAL
Número de puestos *:	1
Tipo de contratación *:	Plantilla
Subtipo de contratación*:	Temporal
Ceco:	FVD Residencial - ADC81
HC presupuestado:	62
HC real:	62

Fig. 3. Fragment of the "hiring request" screen. Notice how the headcount indicators ("HC presupuestado" and "HC real" fields) are highlighted in red. This means that this request is above the headcount of the requesting organizational unit.

Support for the Approval Workflow. The system used ONO's Workflow Engine capabilities to model the approval workflows. A workflow definition has been created for each of the flows associated with each type of employee life-cycle process (hiring, change of working conditions, and dismissal).

Enabling Collaborative Work. The HR Workflow System notifies each employee of new events via e-mail whenever a process needs his participation. This enhances the users experience since the users don't need to be polling the application periodically to check if there is something that requires their attention. Additionally, the system implements an "Inbox" metaphor (similar to the one used in the e-mail systems) that gathers the requests that need participation of the user. When a user enters in the application his inbox is displayed. Additionally a summary of it (figure 4) is present during all his session within the application.



Bandeja de Entrada

Modif. cond. laborales - Central (8)

Modif. cond. laborales - Regional (5)

Baja central (1)

Puesto en HC (39)

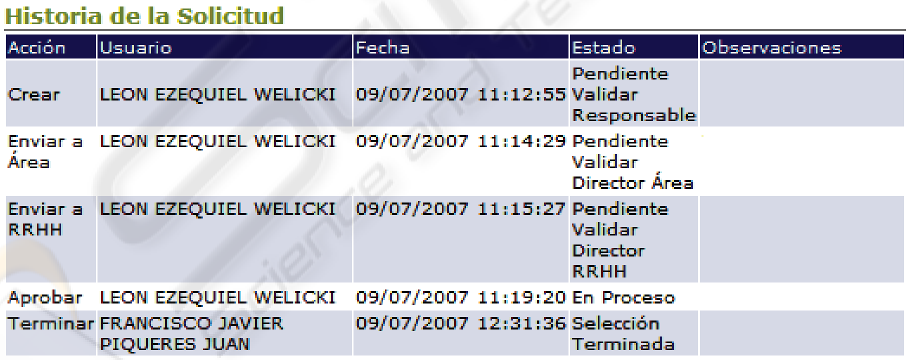
Puesto fuera de HC (77)

Ver Histórico...

Fig. 4. Inbox summary. This widget is displayed in the left menu bar of the screen and is always visible. This widget shows the total number of requests of each type that require the participation of the logged user. When the user clicks in any of the request types the complete inbox is displayed.

Automatic Reporting. The system generates automatically the necessary reports for HR control and for the upper management control. They are generated dynamically and can be requested at any moment providing an up-to-date picture of the overall active employee life-cycle processes in the organization.

Traceability and Auditability. Every action in the approval workflow of the employee life-cycle process instances is recorded in a history log that is displayed within each process instance (figure 5). Additionally, access information is recorded but not shown (this is used for privacy and access control audits)



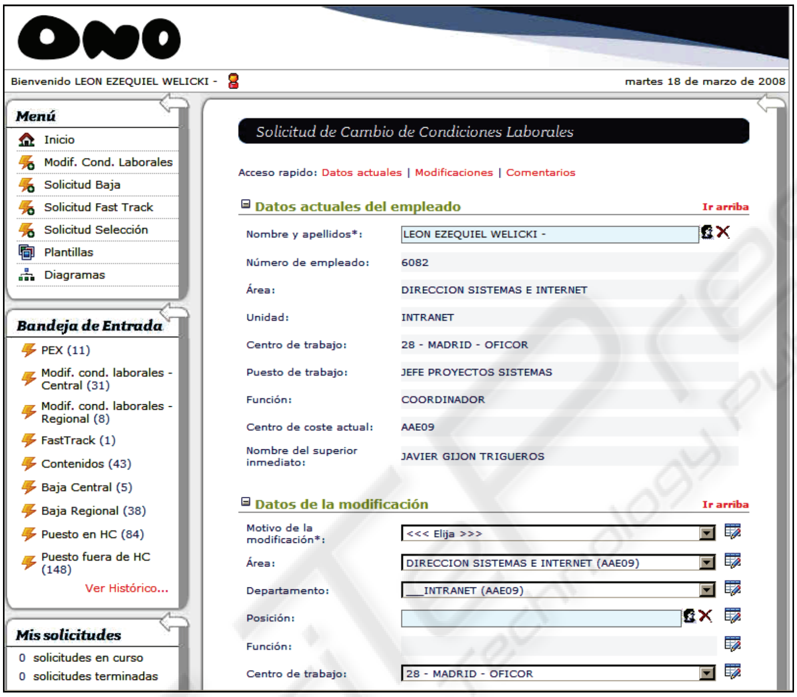
Historia de la Solicitud

Acción	Usuario	Fecha	Estado	Observaciones
Crear	LEON EZEQUIEL WELICKI	09/07/2007 11:12:55	Pendiente Validar Responsable	
Enviar a Área	LEON EZEQUIEL WELICKI	09/07/2007 11:14:29	Pendiente Validar Director Área	
Enviar a RRHH	LEON EZEQUIEL WELICKI	09/07/2007 11:15:27	Pendiente Validar Director RRHH	
Aprobar	LEON EZEQUIEL WELICKI	09/07/2007 11:19:20	En Proceso	
Terminar	FRANCISCO JAVIER PIQUERES JUAN	09/07/2007 12:31:36	Selección Terminada	

Fig. 5. History of a process. Each action performed on the request is recorded (including the execution user, date, target state, and observations).

Reducing Manual Work. All the notifications to participants, reporting, and archival of finished processes is done automatically, eliminating the most tedious and error prone manual tasks.

Input Consistency. The input screens reduce the work to be done by the users. Each participant only needs to complete a very concrete (and ideally small amount of) information in each step of the flow. The employee and organizational related information is extracted directly from ONO's IT infrastructure, and the rest of the fields are parameterized lists (whenever is possible) simplifying considerably the creation of new requests (figure 6).


Bienvenido LEON EZEQUIEL WELICKI -

martes 18 de marzo de 2008

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Mis solicitudes

0 solicitudes en curso

0 solicitudes terminadas

Solicitud de Cambio de Condiciones Laborales

Acceso rapido: Datos actuales | Modificaciones | Comentarios

Datos actuales del empleado Ir arriba

Nombre y apellidos*:	LEON EZEQUIEL WELICKI -
Número de empleado:	6082
Área:	DIRECCION SISTEMAS E INTERNET
Unidad:	INTRANET
Centro de trabajo:	28 - MADRID - OFICOR
Puesto de trabajo:	JEFE PROYECTOS SISTEMAS
Función:	COORDINADOR
Centro de coste actual:	AAE09
Nombre del superior inmediato:	JAVIER GIJON TRIGUEROS

Datos de la modificación Ir arriba

Motivo de la modificación*:	<<< Elija >>>
Área:	DIRECCION SISTEMAS E INTERNET (AAE09)
Departamento:	__INTRANET (AAE09)
Posición:	
Función:	
Centro de trabajo:	28 - MADRID - OFICOR

Fig. 6. Input screen for working conditions change. After an employee is selected (first field) all his information is retrieved from the corporate SAP HR database and displayed in read only fields. The remaining input fields in the form are parameterized drop down lists.

Reduce Bottlenecks in the Processes. The application provides "delegation" functionality that allows an employee to "delegate" in another employee his functions. There are also "super-users" (HR members) that can act in any request at any time. Therefore, except in the case rare situations that need a careful analysis of a senior manager, no employee is a bottleneck for a process instance in the system.

Ease of Use and Far Reach. We based our user interface (UI) in our corporate Intranet (OnoNET) that is well known among all ONO employees (figure 7). We also used all the UI widgets of our development framework having consistency with the existing applications in the intranet. The use of web-based technologies simplifies the deployment and reach of the tool: any user with a browser can access and use the HR Workflow System. Our UI foundation follows the usability guidelines presented in [7] and [9].

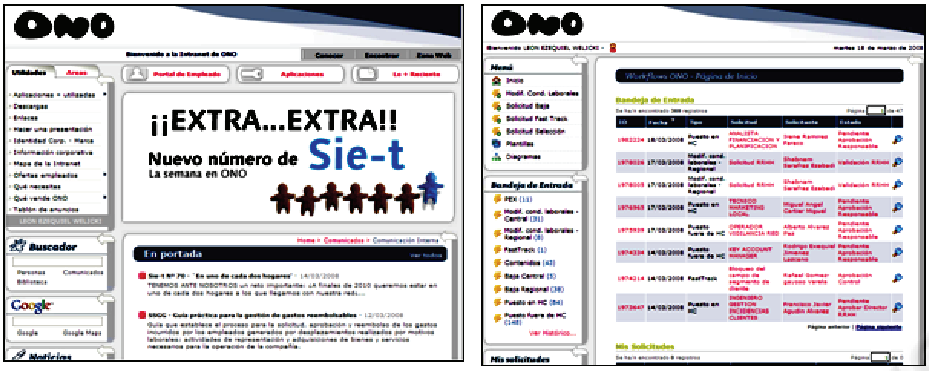

Fig. 7. UI consistency and simplicity: the HR Workflow System (right side of the figure) is similar to the corporate intranet (left side of the figure).

4 Conclusions and Future Work

The workflow system has been in production for a year. It has successfully managed a big number of requests (we cannot disclose that information here), bringing reliability, traceability and audatibility to the employee life-cycle management processes. It has become one of the core systems for supporting HR operations.

The resolution of each employee life-cycle process went down from weeks (in the manual case) to just days or hours (according the complexity of the request). Each participant in the process has to just perform a very concrete action and work with very concrete set of data. Additionally, he is notified via mail every time he needs to perform an action on a request.

Reporting is done automatically. The HR staff doesn't have to spend time on creating reports and the upper management has real-time in information on the on-going employee life-cycle processes.

Everyone in the company knows the processes (they are unambiguous, well documented, and accessible to everyone in the organization) and the processes are always the same for every employee in the organization. They are no longer dependent on the participants. At the same time the processes model the reality of our company and had been tailored to provide as much value as possible to it.

We could summarize the main benefits of the system in these three items:

1. *Reliable Information*: the data sources are accurate based on normalized input and each process instance is auditable.
2. *Agile Information*: the employees are notified only when they have to participate in a flow eliminating unnecessary and unproductive "polling" in an application.
3. *Improved Information Management*: the employee process life-cycle processes information is centralized, easy to access, and normalized, making it easy to know about the state of any on going or finished process in a uniform and simple way.

We improved and normalized the employee life-cycle support significantly, but our work isn't finished yet. Currently, we are working on the following enhancements to the system:

- *Improve Integration with ONO's Implementation of SAP*: after an employee life-cycle process is finished it should be directly registered in SAP (now this step is performed manually) using a loosely-coupled service interface.
- *Dynamic HR Budget with SAP Business Warehouse*: implement SAP BWI to provide dynamic and up-to-date information on the headcount budget. Currently the budget is loaded in the system upon HR's request.
- *Improving the Support for the Selection Process*: currently some parts of the selection process (for hiring new employees) are done offline. The system doesn't provide support for managing the interviews with candidates and managing offer letters (this two issues need very special attention of ONO's legal department according to Spanish laws on information protection).
- *Creation and Archival of Formal Letters*: Automatically create formal letters within each process and archive them in the process instance.

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