Exceptional Scheduling of Shift Workers

Applies to:

SAP enhancement package 1 for SAP NetWeaver Composition Environment 7.1, including SAP NetWeaver Business Process Management and SAP NetWeaver Business Rules Management.

Summary

The effective management of schedules for shift workers is a problem for many organizations across different industries. In today's unstable economic situation, companies are constantly looking for ways to improve the management of employee shifts, achieve flexibility, and reduce costs for additional shifts while at the same time avoiding problems with lack of resources at peak times for their business. This document describes a proposal for a solution to one of the problems companies face with the management of shift workers. This solution is a composite application modeled with the SAP NetWeaver Business Process Management (BPM) and is designed as an extension to the predefined business processes available with SAP ERP and leveraging the Time and Labour Management productized SAP Enterprise Services.

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Authors Bio

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Process Purpose

With the financial situation in 2008, companies are more interested than ever in reducing and controlling total costs. Companies from all industries are looking to aggressively controlled labour as a percentage of these total costs. There are different types of management regulations that could help with the total cost reduction and some of those, such as hiring freezes, are easy to implement in the short term. However, these kinds of regulations could be considered to be limitations and they do not help much with the goal for flexible labour control. The other group, with regulations and practices, could be considered flexible instruments for managing labour as a percentage of the total cost, and some companies have been using these instruments for decades.

Shift workers – one of the instruments that could be considered the secret for the success of every good restaurant, hotel chain, or manufacturer interested in delivering services or products with a very high quality. For this purpose they use highly motivated people, who desire to have the freedom to select the days and the hours they want to go to work.

There are two groups of shift workers. The fist group works regular weekly/monthly shifts and the other group is shift workers on demand - ready to return to their work place (restaurant, hotel, plant) for shift replacement, very high work load during peak hours, equipment failures, and so on.

How should you handle necessary replacement in time when somebody gets ill and will not be able to come to work? Is the shift supervisor always available to pick up the phone when an employee needs to report an absence?

What if absence communication could happen at any time, even during non-working hours? Why not leverage new technologies now, when almost everyone has a computer at home with access to the Internet, and enable employees to report their absence remotely? At night or during the weekend, for example, just at the moment when the employee realizes that it will not be possible to come to work for their shift later today, tomorrow, or on Monday next week.

What if the supervisor is responsible for 100 shift workers? Isn't the situation at your factory the same? How do you achieve a high level of control over the management of shift workers when unplanned absences happen all the time?

The answer is easy, look for automation! Leverage the systems you already have for managing time for your shift workers, and try to resolve the issue of unexpected absences using the information already available in your business systems. If you are currently thinking about a next custom application – stop! This is not the most flexible solution and will only make supervisors even more overloaded since it is another application that they have to handle. To be effective, you have to try to resolve the problem by making almost everyone happy.

Our proposal: Design a process that could handle the problem end-to-end, implement and run the process.

Business Process Overview

With this document, we are providing the process diagram of the proposed solution and also the description of all process steps, events and process participants. The name of the process is "Exceptional Scheduling of Shift Workers" and the process flow covers the process from employee absence registration through the automated replacement proposal, replacement confirmation, and handling the backlog manual replacement to the final automated shift schedule update and sending notifications.

For more information about how to create a process model with SAP NetWeaver Business Process Management, see Modeling Processes with Process Composer and Modeling Rules with Rules Composer in the SAP NetWeaver Composition Environment Library.

To make such a process executable, you need to define the business logic: import and assign service interface definitions, create and assign tasks, create and integrate a Web Dynpro UI, and import and assign data types. How to make this particular process work will be explained in another document that will be published soon.

Process Model

This figure shows the process diagram modeled with the process composer, which is the design time of SAP NetWeaver Business Process Management.
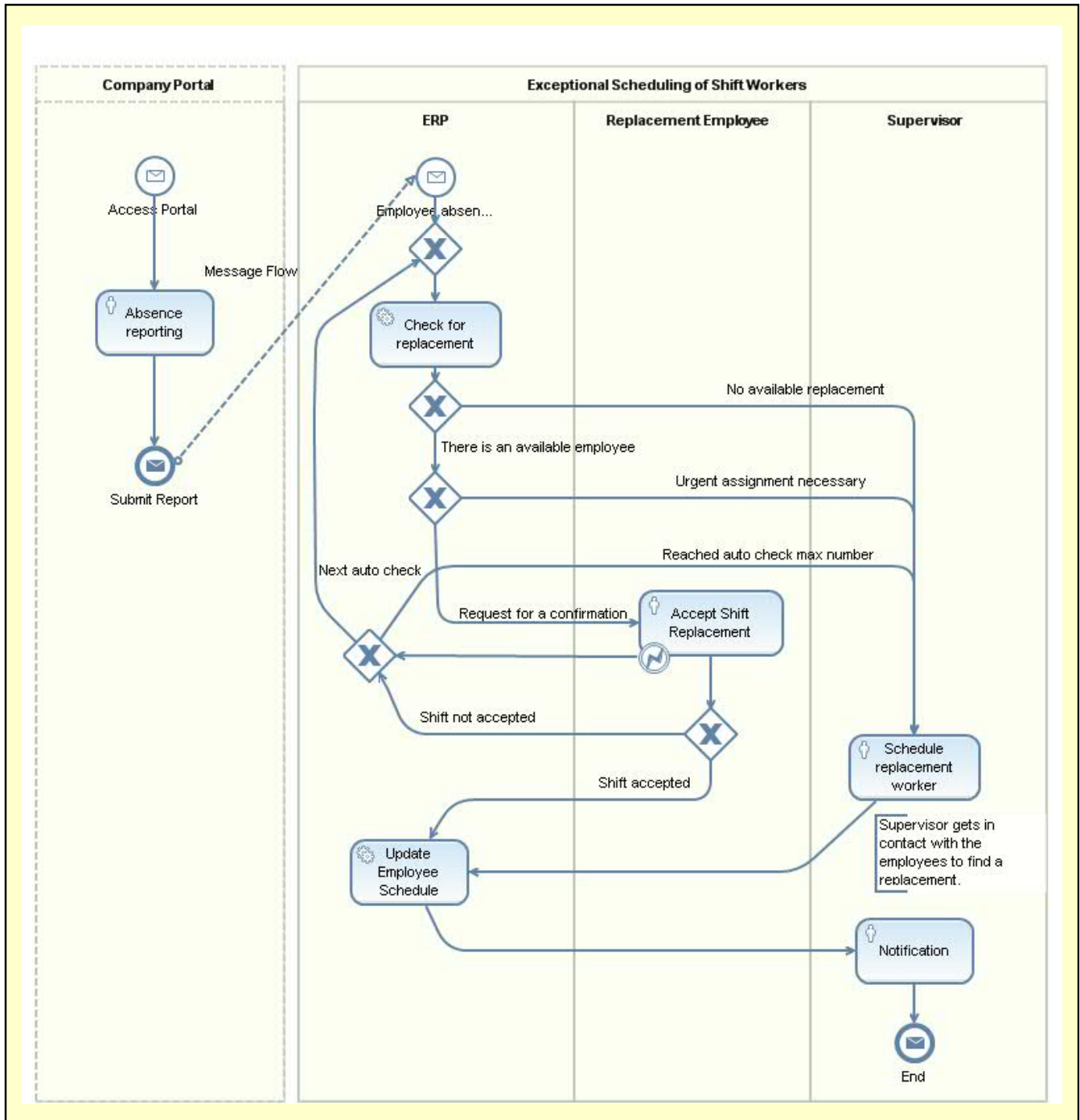
Process Steps

This chapter gives a short description of each process step. Examples of process steps include events, human and automated activities, or gateways.

Pool: Company Portal

This pool is for documentation purposes only and shows how the actual process: "Exceptional Scheduling of Shift Workers" is initiated.

Access Portal (Start Event)

The employee or somebody from the department logs on to the corporate portal of the company, which is also accessible externally, to report employee absence.

Absence Reporting (Human Activity)

The employee or somebody from the department reports the employee absence.

Submit Report (End Event)

The employee absence report is submitted and this initiates the process "Exceptional Scheduling of Shift Workers".

Pool: Exceptional Scheduling of Shift Workers

This pool represents the executable process and comprises all process steps that could be executed following the process flow logic.

Employee absence registration (Start event)

Process starts when somebody submits a form for unexpected absence of one of the shift workers using the company's corporate portal. The person who submits the form could be the employee or somebody from the department and it could be before the start of the shift or once the shift has been already started but the employee is not at work.

Check for replacement (Automated activity)

The first process step of this process after the start event is "Check for replacement" and it is an automated activity. In this step, a web service interface is used to check if there is an available employee within the employee pool who is not scheduled for a shift at the same time.

Is there an available employee? (Gateway)

Directly after the automated activity, there is an exclusive choice gateway that splits the process flow into two directions, where only one of them could be valid. If the condition of this gateway will not be met (there is not an available employee in the pool) then the process will send a task to the supervisor to assign a replacement employee manually. If the condition at the gateway will be met, then the process will go to the next condition where the urgency of the replacement will be checked.

Do we need an urgent manual replacement or do we have time to wait for a confirmation? (Gateway)

This gateway could be covered with a business rule using different corporate criteria to define how urgent the request for a replacement is. For example, the shift start time could be one of the most common criteria for such a business rule. According to the gateway resolution, if the replacement assignment is considered urgent, the process goes directly to the supervisor with a proposal for a replacement employee (name/ID delivered with the automated activity after the start of the process). Then the supervisor has to contact the employee proposed by the system and quickly get confirmation, or agree on the shift replacement with another employee and at the end confirm the change in the shift assignment.

If the process is not classified urgent after the gateway rule execution, a task will be assigned to the replacement employee proposed by the system for confirmation.

Accept shift replacement (Human activity with non-critical exception handling)

When an employee is selected by the system as a replacement, a task is sent to them to confirm whether they accept the new shift assignment proposal. This is a human activity and a task will be send to the selected replacement employee. This task will be defined with a completion deadline and if the task is not completed on time there will be a critical exception for the continuation of the replacement finding process. If the task is completed on time, the result of this task will be the condition parameter for the next gateway.

Is the proposed shift accepted by the automatically selected employee? (Gateway)

This is an exclusive choice gateway and only one of the process paths will be executed. If the proposed shift has been approved by the employee in the previous process step, then the process will go to the next step – the automated recording of the change in the schedule. If the employee does not accept the shift proposal, then the process will go to the next gateway.

Has the maximum number of allowed auto checks already been reached? (Gateway)

At this gateway, the system will check if it is still acceptable to try to find a replacement automatically or if the number of maximum allowed auto checks has been already reached and a task for replacement assignment has to be sent directly to the supervisor.

Schedule replacement worker (Human activity)

Schedule replacement worker is a human activity that will be assigned as a task to the supervisor role in three cases. The first case is when the system does not find an available employee within the pool of employees working on regular shifts. In this case the supervisor will have to find a replacement.

The second case is when an available employee is found by the system but the replacement assignment is considered urgent and there is no time to wait for the employee to send the confirmation. For the second case, the name/ID of the employee found by the system will be provided as a proposal to the supervisor through the task for a replacement assignment that is sent to the supervisor.

The third case is when the maximum number of auto checks has been reached and the supervisor is assigned with the task of completing the replacement assignment by finding an employee.

In all cases the supervisor is responsible for getting in contact with a replacement employee and getting confirmation before completing the task by submitting the name of the replacement. The difference is that in the second case the task is simplified since the replacement proposal (name/ID) comes from the automated activity. For the third case, the supervisor receives the list of employees who did not accept the proposal to become shift replacements as well as the list with employees who didn't answer the request in time.

Update employee schedule (Automated activity)

The update employee schedule is an automated activity and will be completed if the employee confirms the acceptance of the proposed shift or when the supervisor provides the name/ID of the replacement employee after his agreement with this employee.

Notification (Human activity)

The supervisor is notified of changes to the shifts schedule that are recorded in the system. The notification will also contain a short report on the list of activities that have happened since the start of the process if the replacement assignment has been completed automatically (without involvement of the supervisor). This is the last process step and after it the process ends.

Process Roles

The following table lists the process roles and the human activities they are involved in.

Process Role	Human Activity / Task	Potential owners	Comment
Replacement employee	Accept shift replacement	Employee selected by the system as available to cover the replacement.	Potential owner could be assigned on Lane lever or Task level using an expression
Supervisor	Schedule replacement worker	Employee supervisor	Potential owner could be assigned on Lane lever or Task level using an expression
Supervisor	Notification	Employee supervisor	Potential owner could be assigned on Lane lever or Task level using an expression

Automated Activities

The following table lists the automated activities and the systems where the activity is performed.

System	Automated Activity	Web Service definition source
SAP ERP (HCM)	Check for replacement	SAP Enterprise Service
SAP ERP (HCM)	Update employee schedule	SAP Enterprise Service

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