

# Strategic Alignment of Business Processes

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# Overview

- Introduction
- Background
- Strategic Alignment Framework
- Implementation
- Conclusion

# Introduction

- Problem
  - When a strategy is created, is it realizable?
  - When a strategy is realized, has it been realized optimally?

# Introduction

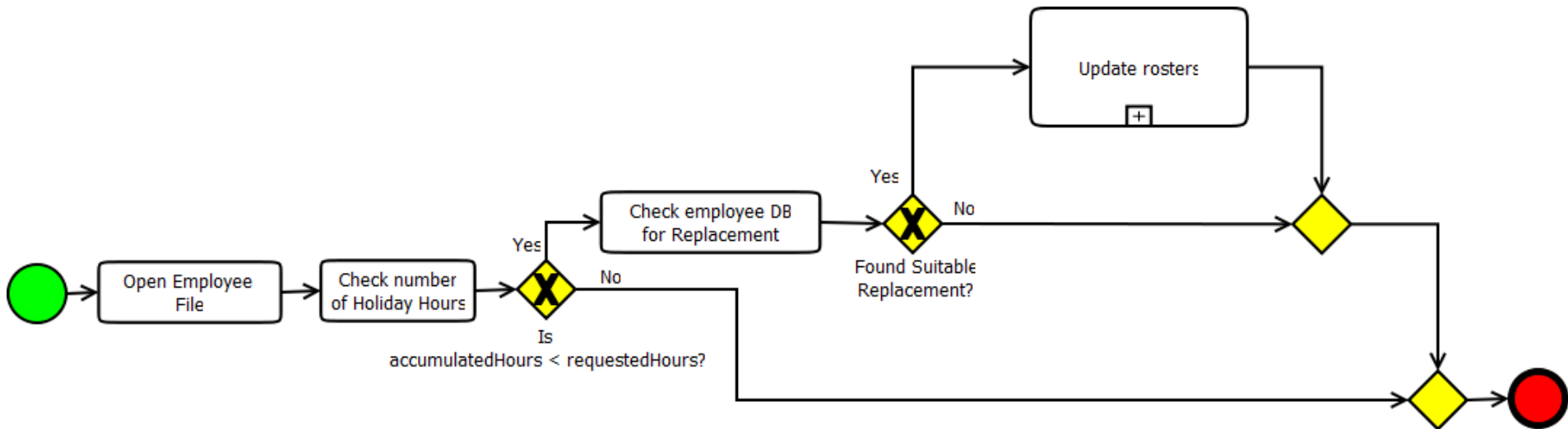
- Solution
  - Create a framework for correlating of business process models and strategies
  - Identify any unrealized strategies
  - Compute the optimal set of processes for realization

# Introduction

- Benefits
  - Clear understanding
  - Identification of key capabilities
  - Sustainability

# Background

- BPMN
- A business process is a process that describes the order in which a series of steps need to be executed, using a flow chart.

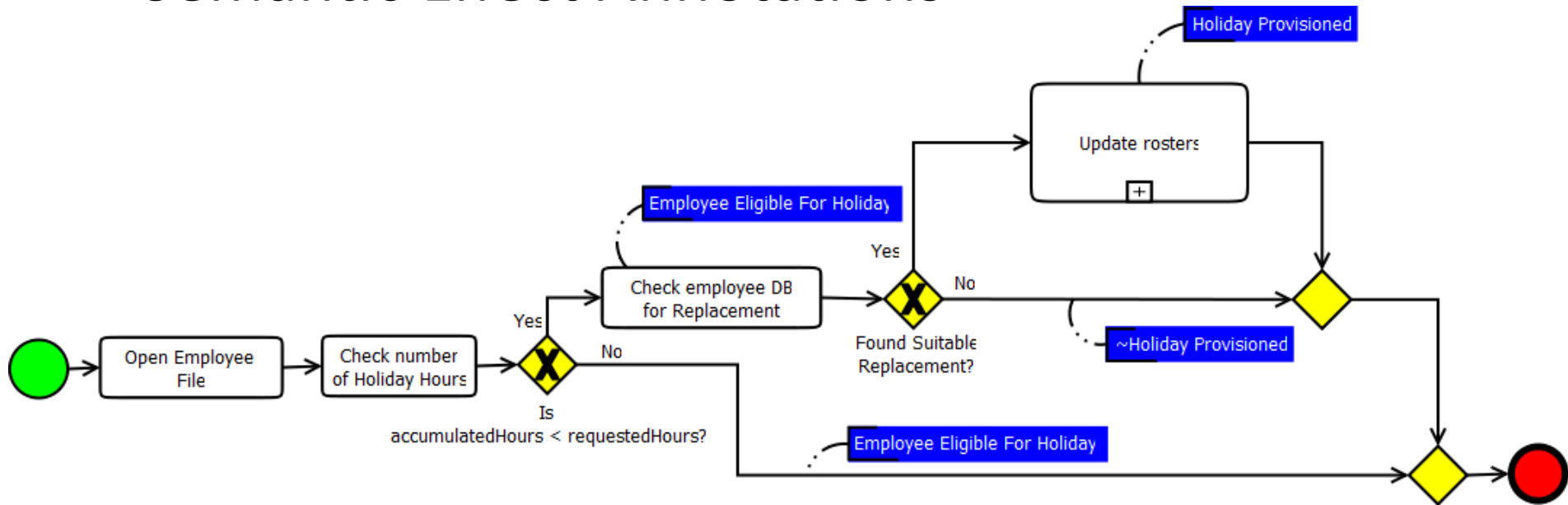


# Background

- Semantic Effect Annotations
  - Semantic effect annotations offer a means to reason over business process models.
  - Capture the organizational operation model, i.e., “what does this process do?”
  - Analysts annotate activities in the model with descriptions of the changes that occur as a result of the activities execution.

# Background

- Semantic Effect Annotations



Each activity's immediate effect can be accumulated with the effect of the immediate effect from the initial activity's successor.

Accumulation is pair-wise and an effect scenario is the result of accumulating effects through a process model from a start event to an end event



# Background

- SML
  - Strategy Modeling Language (SML) is a language that can be used by senior executives for describing organizational strategies.
  - The core modeling elements of SML are: Functional Goals, Plans, and Optimization Objectives.
  - Goals are general desired outcomes that organizations want to meet and when described in SML, can be evaluated to be in the boolean state of either fulfilled or not fulfilled.
  - Each plan in SML, describes milestones in an organizational strategy. Where the achievement of goals in sequence are key steps that must be completed in a particular order.
  - An optimization objective in SML is used to discriminate preferences for strategic outcomes.

# Strategic Alignment Framework

- Goal Alignment
- Plan Alignment
- Optimization Objective Alignment
- Strategic Alignment

# Goal Alignment

To describe the alignment between a process model and a strategic goal, we have build upon the literature on goal bpm and goal realization. Realization is a relationship between a process and a strategic element. Realization holds if a process  $P$  exists with an end effect scenario that entails a goal  $G$

A process  $P$  with a set of end effect scenarios  $E_P$ , realizes a goal  $G$ , if and only if an end effect scenario of  $P$  entails  $G$ , i.e.,  $\exists \epsilon \in E_P$  s.t.  $\epsilon \models G$ . We will write:  *$P$  alignedTo  $G$*  if this is the case.

# Goal Alignment

In the event that multiple process models are needed for a goal to be realized then we use the following definition for goal alignment.

Let  $\mathcal{P}$  be a process portfolio, let  $\mathcal{C}_{\mathcal{P}}$  be the composite process portfolio derived from  $\mathcal{P}$  and let  $\mathcal{G}$  be a set of goals.  $\mathcal{P}$  is aligned to a single goal  $G$  iff  $\exists P \in \mathcal{C}_{\mathcal{P}}$  s.t.  $P \text{ alignedTo } G$ . This is denoted  $\mathcal{P} \text{ alignedTo } G$ . We will say  $\mathcal{P} \text{ alignedTo } \mathcal{G}$  iff  $\forall G \in \mathcal{G}. \mathcal{P} \text{ alignedTo } G$ .

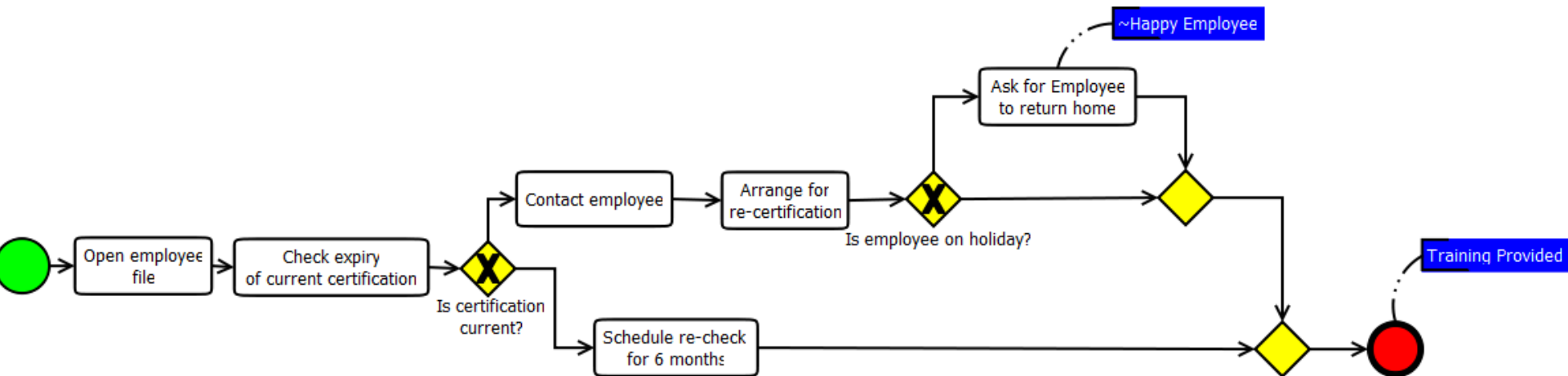
# Goal Alignment Example

Consider the following functional goal:

Maintain ongoing training : TrainingProvided.

There is an end effect scenario in the Training Process where

[TrainingProvided] is an execution consequence. As [TrainingProvided] is a requirement of the goal, then we can say that the training process realizes the goal of Maintaining ongoing training.

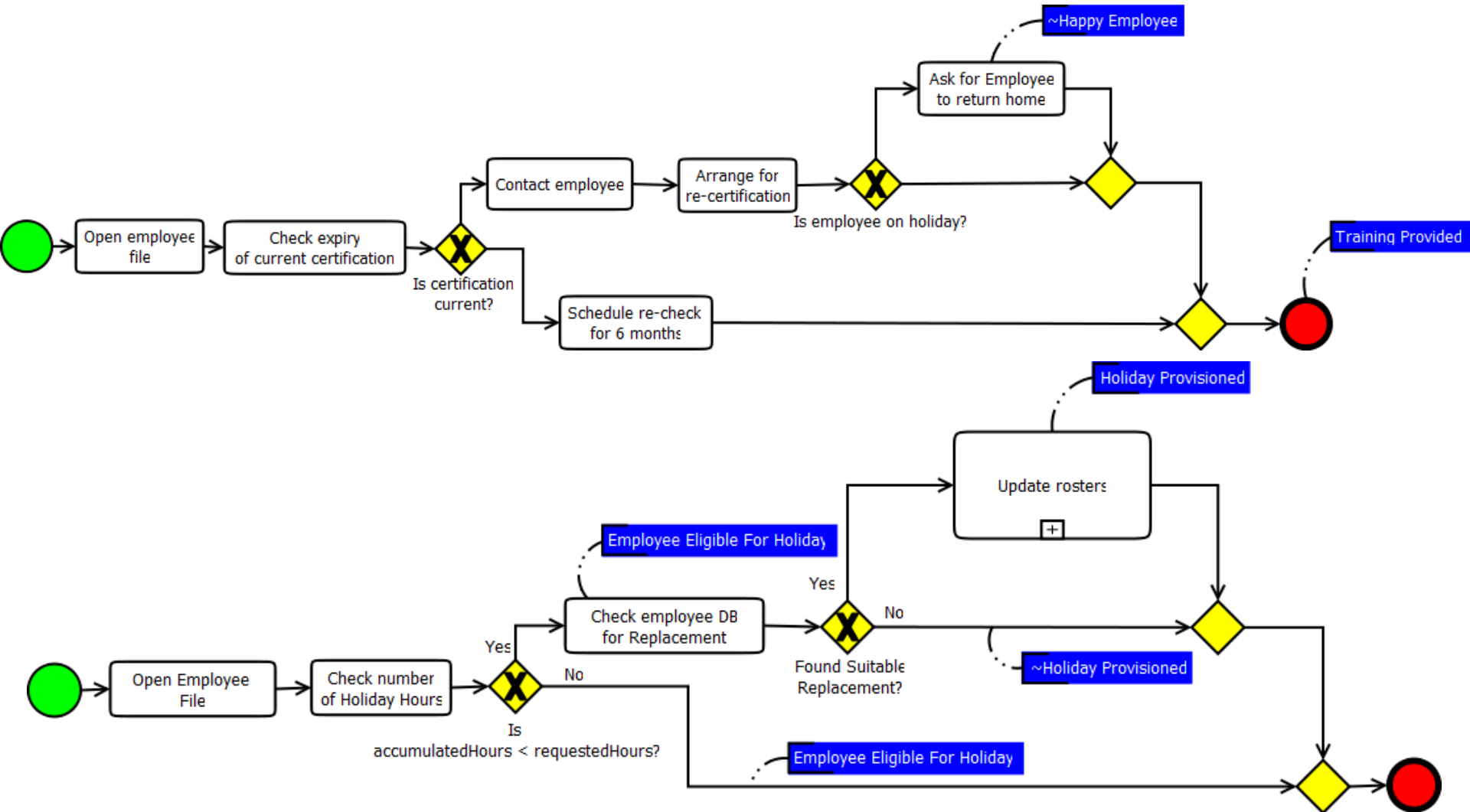


# Plan alignment

Let a plan  $L$  be a sequence of goals  $\langle G_1, \dots, G_n \rangle$ . For the plan to be completely realized by a process model (or process models) each pair of consecutive goals  $\langle G_i, G_j \rangle$  in the plan must be realized. A plan is realized and aligned to a set of processes if all consecutive goal pairs in the plan are realized. Pairs of goals are realizable in the following ways:

1. Given two processes  $P_k$  and  $P_l$ , where the processes can be composed in the sequence  $\langle P_k, P_l \rangle$  to form process  $P_m$ , if  $P_k$  realizes  $G_i$  (but not  $G_j$ ) and  $P_m$  realizes  $G_i \wedge G_j$  then the process composition  $P_m$  realizes the goal pair.
2. Given a semantically annotated process model  $P_n$ , where there is an activity  $a$  with effect scenario  $\epsilon_a$  that entails the goal  $G_i$  and there is an activity  $b$  with effect scenario  $\epsilon_b$ , that occurs in the pathway after activity  $a$ , that entails  $G_i \wedge G_j$  and there is an end effect scenario of process  $P_n$  that entails  $G_i \wedge G_j$  then the process  $P_n$  realizes the goal pair. The effect scenario  $\epsilon_a$  must not entail  $G_i \wedge G_j$ , otherwise the realization order of the goals will be incorrect.

# Plan Alignment Example



# Plan Alignment Example

Consider the following strategic goals:

Maintain high employee morale : Happy Employee

Maintain ongoing training : Training Provided.

And the rule: Employee Eligible for Holiday & Holiday Provisioned > Happy Employee

If we wish to consider both goals to be in a strategic plan that says first ensure that all employees are happy and secondly that employee's are highly skilled. Then we would aim to find processes that could satisfy the plan.

Recall the Training process with effect scenario Training Provided.

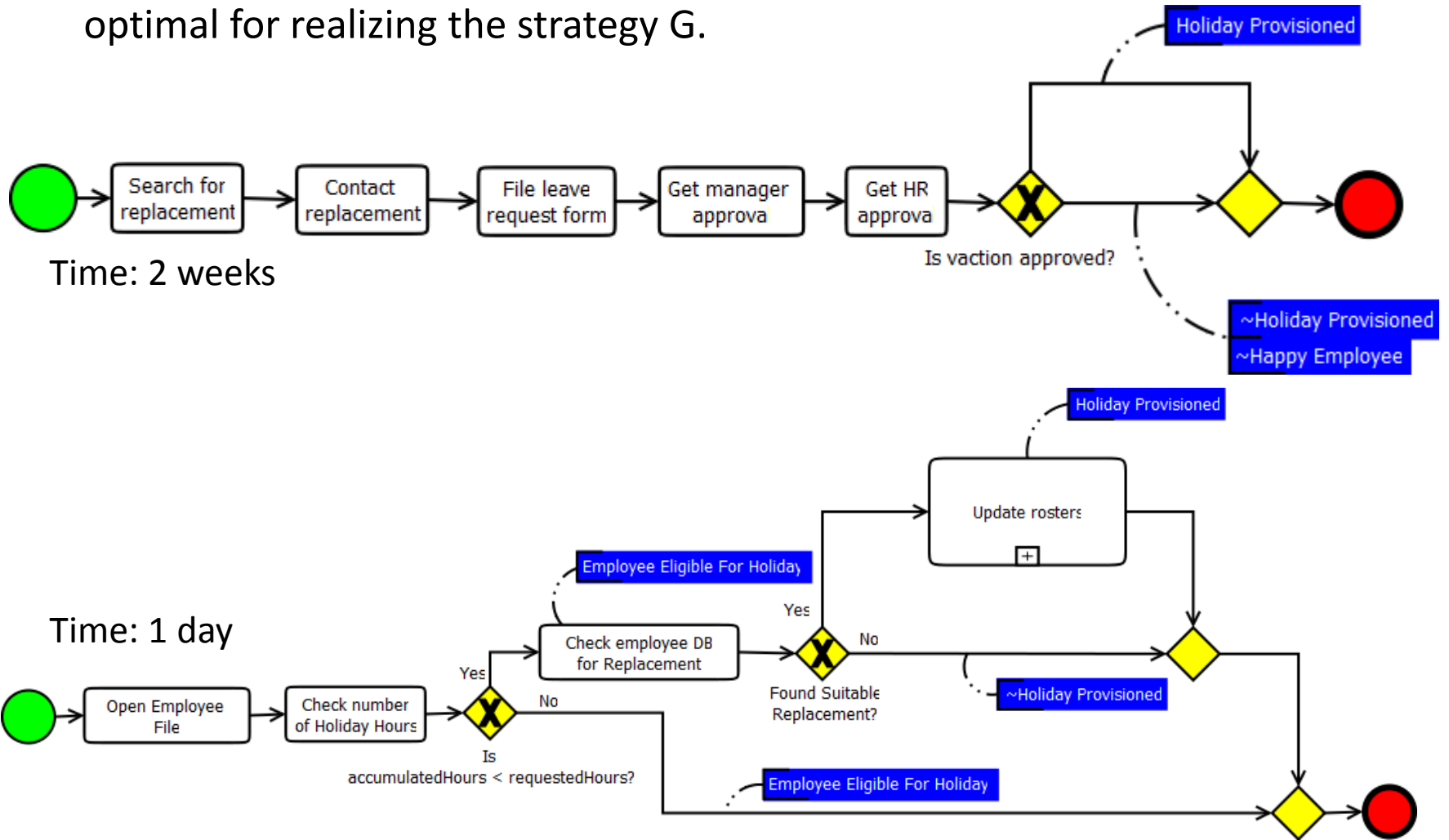
Looking at the Employee Vacation Request process we can see [Happy Employee] can be inferred from the end effect scenario [Employee Eligible for Holiday, Holiday Provisioned]

To check for alignment, we first ask if the goal Happy Employee has been realized then we consider first the Training process, it is noticeable that if the employee is on holiday during this process then he will become unhappy. We then consider the Employee Vacation Request process and here the goal is aligned as Happy Employee is an effect of the process. For the second goal Training Provided we check if the Employee Vacation Request process also is aligned to the new goal, which it is not. We then compose the Employee Vacation Request process and the Training process such that the first goal is still realizable. We now find that we can also realize the second goal Training Provided. We can now say that both processes realize the strategic plan.



# Optimization Objective Alignment

To compute optimization objective alignment, given a strategy G, and two processes P and Q with, where both P and Q are aligned to G. We use QoS measures of the process capabilities to find the process model that is optimal for realizing the strategy G.



# Strategic Alignment

Let  $\mathcal{C}_{\mathcal{P}}$  be the set of the composed of processes of  $\mathcal{P}$ . Let  $\mathcal{G}$  be a collection of strategies.  $\mathcal{P}$  *alignedOptimallyTo*  $\mathcal{G}$  iff:

1. For each  $G \in \mathcal{G}$ : (completeness)

(a)  $\exists \mathcal{P}' \subseteq \mathcal{C}_{\mathcal{P}}. \mathcal{P}'$  *alignedOptimallyTo*  $G$

(b) There is no  $\mathcal{P}'' \subset \mathcal{P}'$  where  $\mathcal{P}''$  satisfies condition *a*. (realization minimality)

(c)  $\neg \exists P \in \mathcal{C}_{\mathcal{P}}. (P \wedge G \models \perp)$  (consistency)

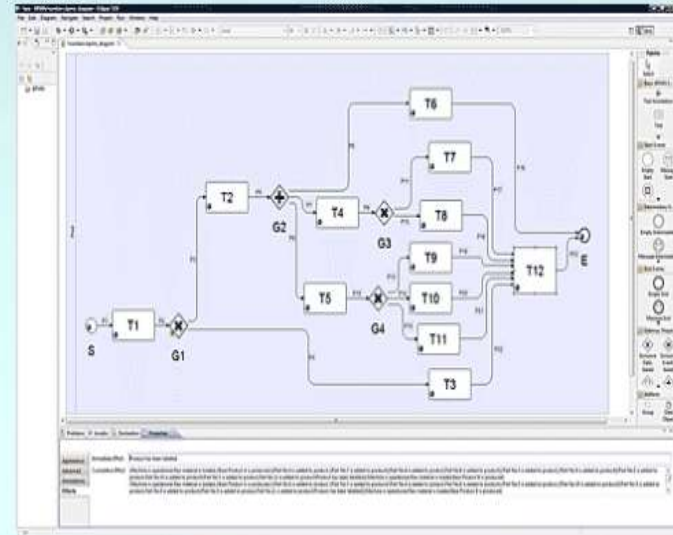
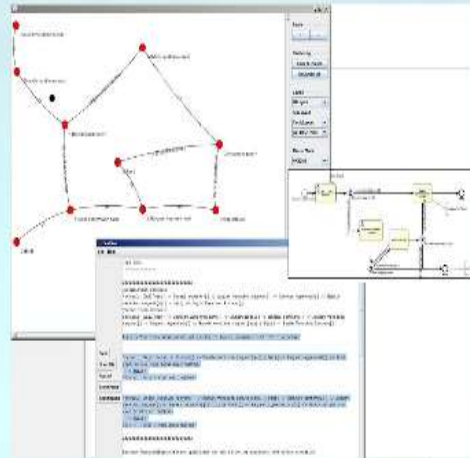
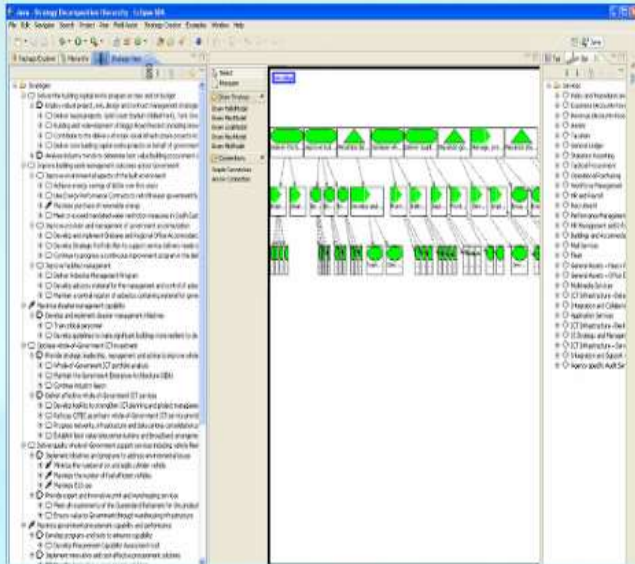
2. There is no  $\mathcal{P}^* \subset \mathcal{P}$  where  $\mathcal{C}_{\mathcal{P}^*}$  satisfies condition 1. (alignment minimality)

# Tool Family

*ServAlign*

*TextSeer*

*Process Seer*



*ProcAlign*

# Implementation

# Conclusion

- Created a framework for correlating of business process models and strategies
- Able to identify any unrealized strategies
- Able to compute the optimal set of processes for realization
- Future Work
  - Describe process composition in greater detail.
  - Examine the realization of strategies through evolving processes models.
  - Consider realization of Strategies using alternative blue process models.

# Thankyou

- Questions?