A Genetic Algorithm for Resource Consumption Optimization within Inter-Organizational Business Process Execution

Eyenga Ovono Tatiana
University of Yaounde I, Cameroon

Atsa Etoundi Roger
University of Yaounde I, Cameroon

Abstract

The execution of an inter-organizational business process within a networked enterprise consumes a lot of resources such as data, throughput and time. Several researchers have made significant contribution in the field of resource allocation problems. In this paper, we address the resource consumption problem within inter-organizational business process execution. This means that, we want to show how to optimize resources utilization during the execution of multiple instances of workflow. This results in decision-making problem. It's the reason why we have decided to use genetic algorithm to overcome this issue. For this purpose, we have translated an inter-organizational workflow as a weighted directed dependency graph of web services which execute the tasks of the process. The dynamic of the workflow is observed based on the fact that for the same inter-organizational business process, we can find multiple workflow instances and, each instance is represented by the dependency graph of web services. For each dependency graph, we can derive an interaction matrix between web services. Each element of the matrix refers to the type of interactions (successful interaction, failure interaction, absent of interaction) between two services implementing the tasks of the business process. Based on this abstract representation of a workflow at runtime, we have made an analysis which have helped us to define a genetic algorithm for resources consumption optimization within inter-organizational business process execution.

Keywords

Genetic Algorithm, Resource Optimization, Inter-organizational Business Process, Dependency Graph.