AN ALGORITHM FOR WEB-BASED DISTRIBUTED HETEROGENEOUS SIMULATION WORKFLOW MULTI-OBJECTIVE OPTIMIZATION

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Keywords: Optimization methods; scheduling; simulation workflow; evolutionary algorithms; web services; distributed tools; heterogeneous network;

Abstract. The increased interest on processing large scale & heterogeneous problems in distributed environments created the need of software tools that would support such complex workflows. Especially, simulation workflow scheduling has become an important area as it allows users to process large scale problems in a more flexible way. In most complex simulation workflows the user has to select the optimal use of local and external resources that will satisfy its requirements under the specific time & cost constraints. In this work we present a Simulation Workflow Optimization (SWO) algorithm that is based on heuristic optimization techniques (Genetic Algorithms) and delivers an optimized workflow implementation of an initial plan or workflow schedule. The aim of SWO is to address the increased complexity encountered when one or more distributed & heterogeneous processes are involved in a simulation workflow. A heterogeneous simulation workflow contains several virtual tasks that involve completely different software tools, resources, requirements and often contradictory objectives. In addition, the distributed environment of large scale problems requires the software tools to be accessible from anywhere as been local. In order to support remotely the solution of each specific optimization problem, the SWO algorithm is developed as: a) a web based tool designed to function in a distributed environment and invoked using web services, and b) a tool that can be specialized per task, domain, product or application by means of knowledge bases, ontologies and user provided information.

REFERENCES


