Cloud Transition: Integrating Cloud Calls into Workflow Petri Nets

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Extended Abstract

In this paper, we present the Cloud Workflow Transition. An extension of Petri nets formalisms to adopt Cloud interactions. This allows workflows to request compute or storage services from the cloud. Such refinements permit to codify operational procedures into Petri net models and reduce user implication during the specification of their workflows. The main purpose behind our proposed refinements is to allow users to automatically execute workflows on distributed infrastructures (Cloud, SOA, grid, cluster).

Through the Cloud transition users can specify their requests formulated as tasks and parameters (see Figure 1). These requests will be treated in a transparent way i.e. that technical information is hidden from the user. The WFMS will then either accept the request and make the connection to the specified Cloud services according to user inputs or will reject it. The input places of the Cloud transition model the pre-conditions of an event, the input data for the computational task. The output places of the transition model the post-conditions associated with an event, the results of the computational task.

Our approach uses workflow Petri nets [1]. More specifically we use the reference net formalism [2] extended with a specialized workflow task transition [3]. Renew, the **Re**ference **Ne**t **W**orkshop, is our chosen tool for modeling with reference nets. A very interesting and useful property of reference nets in Renew is their use of the so-called shadow layer. It hides the technical details from the user, who can concentrate on simply the nets.

The technical integration of the Cloud transition into our workflow nets and workflow managment system is carried out in three main steps: The integration into the existing workflow net formalism for Renew [3], the integration into the current WFMS in Renew [4] and finally the integration into the user interface. Due to the dynamic aspect of the cloud computing, further integration issues are investigated such as including Quality-of-Service (QoS) requirements (time and expenditure limit). The WFMS should be able to identify and handle failures and support reliable execution in the presence of concurrency to guarantee a high level of performance and availability of services.

We plan to define the oprational semantics of the Cloud transition using Renew as well as a working use case. As an example, we intend to include the Cloud transition to model and enact a storage workflow using existing Cloud storage services within a Petri net-based multi-agent system.

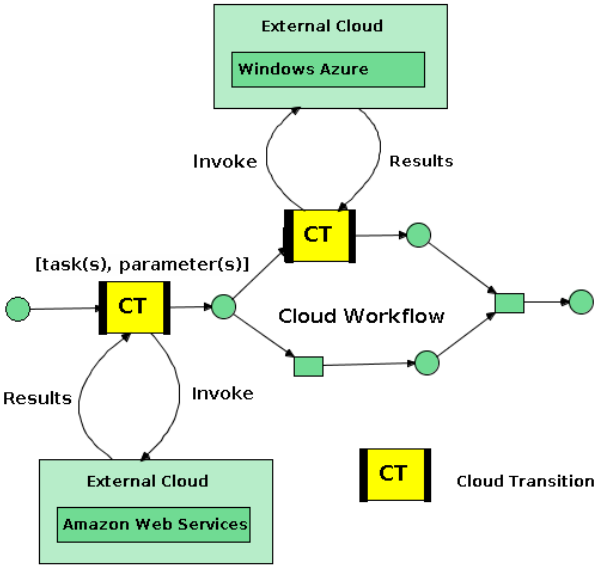

Fig. 1. The cloud transition

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