Friday 26 January 2018
11h00
UT3 Paul Sabatier, IRIT, Salle des Thèses

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A Bottom-up Process Management Environment dedicated to Process Actors

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Abstract: Companies increasingly adopt process management environments, which offer promising perspectives for a more flexible and efficient process execution. Traditional process management environments embodies a top-down approach in which process modeling is performed by process designers and process enacting is performed by process actors. Due to this separation, there is often a gap between process models and their real enactments. As a consequence, the operational level of top down process environments has stayed low, especially in system and software industry, because they are not directly relevant to process actors' needs.

In order to facilitate the usage of process environments for process actors, this thesis presents a user-centric and bottom-up approach that enables integration of process actors into process management life cycle by allowing them to perform both the modeling and enacting of their real processes. To this end, first, a bottom-up approach based on the artifact-centric modeling paradigm was proposed to allow each process actor to easily describe the process fragment containing the activities carried out by his role. The global process is thus decomposed into several fragments belonging to different roles. Each fragment can be modeled independently of other fragments and can be added progressively to the process model; therefore the process modeling becomes less complex and more partial. Moreover, a process fragment models only the structural aspect of a role's activities without anticipating the behavior of these activities; therefore the process model is less prescriptive.

Second, a data-driven process engine was developed to enact activities coming from different process fragments. Our process engine does not require predefined work-sequence relations among these activities to synchronize them, but deduces such dependencies from their enactment-time exchanged artifacts. We used a graph structure name Process Dependency Graph (PDG) to store enactment-time process information and establish the dependencies among process elements.

Third, we extend our process environment in order to handle unforeseen changes occurring during process enactment. This results in a Change-Aware Process Environment that allows process actors reporting emergent changes, analyzing possible impacts and notifying people affected by the changes.
In our bottom-up approach, a process is split into several fragments separately modeled and enacted by process actors. Our data-driven process engine, which uses the availability of working artifacts to synchronize activities, enables enacting independently process fragments, and even a partially modeled process where some fragments are missing. The global process progressively emerges only at enactment time from the execution of process fragments. This new approach, with its simpler modeling and more flexible enactment, integrates better process actors into process management life cycle, and hence makes process management systems more attractive and useful for them.