

# A Logic-Based Approach to Business Process Customization

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**Abstract.** In this invited lecture, I will present a logic-based approach to modeling and engineering processes that arose from work in AI. The approach is based on a logical framework for modeling dynamic domains called the Situation Calculus. It also uses a language called ConGolog for specifying complex processes on top of the Situation Calculus. By using such a logical framework we can provide clear formal characterizations of problems that arise in the area of business process design and management. Available automated reasoning techniques can also be used to analyze and synthesize processes. After introducing the framework, I will discuss how one can use it to model process customization, where one customizes a generic process to satisfy certain constraints required by a client. I will show how we can allow for uncontrollable actions by the process, and then define a notion of maximally permissive supervisor for such a process, i.e., a supervisor that constrains the process as little as possible, while ensuring that the desired constraints are satisfied. We have shown that such a maximally permissive supervisor always exist and is unique. Finally, I will briefly discuss how one can use the framework to model the problem of process orchestration, where one wants to orchestrate a set of available services to produce a desired process.