

Evaluating BDI Agents to integrate resources over Cyberinfrastructure

Leonardo Salayandía, Paulo Pinheiro da Silva, and Ann Gates
leonardo@utep.edu; paulo@utep.edu; agates@utep.edu

Department of Computer Science
University of Texas at El Paso

The vision of GEON is to enhance interdisciplinary collaboration of earth science efforts through the creation of Cyberinfrastructure (CI). The basic problem of enabling users to easily build complex CI-based applications and services by integrating resources available at GEON has been addressed by workflow technologies such as Kepler. This work aims to evaluate a Belief-Desire-Intension (BDI)-based agent as an alternative approach to Kepler workflows. The hypothesis is that DBI agents can adapt and better react to new, changing CI situations while executing workflows. BDI agents contain a set of *beliefs* that reflect the current state of the world, e.g., as provided by CI resources, a set of *desires* that represent the state of the world that the scientist wants to achieve, and a set of procedures that can be executed by the agent to achieve stated desires. The BDI agent instantiates procedures that are applicable to current beliefs, i.e., *intentions* are created and executed by the agent. Additionally, the agent has the ability to backtrack to alternative intentions as beliefs are changed dynamically. In order to evaluate BDI agents to integrate resources over CI, a simple geophysical procedure that utilizes several GEON resources is implemented using SPARK, a mature implementation of a BDI agent framework. This research aims to evaluate the adaptability of BDI workflows by evaluating the effectiveness of BDI agents to leverage CI while considering their extensibility to address issues that are still pending in CI developments; some of which are: data transferring between distributed resources, interoperability of independently created resources, and user evaluation of the validity of applications and services built from CI resources. Finally, a contrast is provided between workflow technologies and BDI agents.