

# Planning Multi-modal Transportation Problems

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## Abstract

Multi-modal transportation is a logistics problem in which a set of goods have to be transported to different places, with the combination of at least two modes of transport, without a change of container for the goods. The goal of this paper is to describe TIMIPLAN, a system that solves multi-modal transportation problems in the context of a project for a big company. In this paper, we combine Linear Programming (LP) with automated planning techniques in order to obtain good quality solutions. The direct use of classical LP techniques is difficult in this domain, because of the non-linearity of the optimization function and constraints; and planning algorithms cannot deal with the entire problem due to the large number of resources involved. We propose a new hybrid algorithm, combining LP and planning to tackle the multi-modal transportation problem, exploiting the benefits of both kinds of techniques. The system also integrates an execution component that monitors the execution, keeping track of failures and replans if necessary, maintaining most of the plan in execution. We also present some experimental results that show the performance of the system.

*(The full paper describing this system appears in the ICAPS-11 Proceedings at pages 66-73)*