# Anticipatory Shipping: A Commercial Application of Pre-positioning

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## Abstract

With the rise of data-mining, pre-positioning has gradually become a viable option for retailing companies. We develop a two-stage stochastic programming model to study the commercial application of pre-positioning under the context of anticipatory shipping. The model combines transportation problem with facility location model under stochastic demand. We propose a variety of solution techniques such as Benders decomposition and Lagrangian-based relaxation scheme to cope with different practical difficulties. Our study seeks to address business pre-positioning issues that have not been well-explored in previous literature.

## Keywords
Pre-positioning, mixed integer programming (MIP), two-stage stochastic programming, Benders decomposition, Monte Carlo sampling, Lagrangian relaxation, L-shaped method, facility location mod