

Abstract

The prevalence of omni-channel purchase behavior motivates a slew of new supply chain problems. Here, we describe one such new problem: the 'omni-channel fulfillment problem'. We formulate this problem as an online optimization problem. We propose an algorithm for this problem based on the primal-dual schema. We provide a performance analysis and an upper bound on achievable competitive ratios establishing that our algorithm is optimal in the face of adversarial demand.

Our algorithm has been implemented at multiple large retailers. We describe one such large-scale implementation. This implementation processes as many as hundreds of thousand of orders on peak demand days. We discuss the savings achieved through optimal order-fulfillment decisions that simultaneously increase turn and lower shipping costs for this implementation.