Optimal Sortation Strategy for a Distribution Network in an E-Commerce Supply Chain

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Abstract : The backbone of any retail e-commerce success story is a unique design of supply chain network, providing the business an unparalleled speed and scalability. Primary goal of the supply chain strategy is to meet customer expectation by offering fastest deliveries while keeping the cost minimal. Meeting this objective at the large market that India provides is the problem statement that we have targeted here. There are many models and optimization techniques focused on network design to identify the ideal facility location and size, optimizing cost and speed. In this paper we are presenting a tactical approach to optimize cost of an existing network for a predefined speed. We have considered both forward and reverse logistics of a retail e-commerce supply chain consisting of multiple fulfillment (warehouse) and delivery centers, which are connected via sortation nodes. The mathematical model presented here determines if the shipment from a node should get sorted directly for the last mile delivery center or it should travel as consolidated package to another node for further sortation (resort). The objective function minimizes the total cost by varying the resort percentages between nodes and provides the optimal resource allocation and number of sorts at each node.