

Two-Echelon Vehicle Routing Problems: A short review, some models and directions for future research

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In the two-echelon vehicle routing problem (2E-VRP), the distribution network is split into two echelons. Different vehicles are operated on the first and second echelon to maintain economies of scale and adhere to any vehicle restrictions that may be present in either echelon. Intermediate facilities are located at the borders of the echelons to facilitate the consolidation and transshipment of goods between echelons.

Examples of two-echelon distribution systems include express delivery, grocery and hypermarket products distribution, multi-modal freight transportation, city logistics, and e-commerce and home delivery services. In recent years, the body of literature on the 2E-VRP has expanded significantly.

Many research papers have appeared in the scientific literature so far, which underlines both the academic and practical relevance of 2E-VRPs. In this review, we structure and revise all literature on the 2E-VRP. Mathematical formulations and benchmark datasets used to test and to evaluate new algorithms are reviewed and discussed.