
A Dynamic Discretization approach to the integrated Service Network Design and Vehicle Routing Problem

Yun He^{2,1}, Fabien Lehuédé^{*†1,2}, and Olivier Péton^{1,3}

²Laboratoire des Sciences du Numérique de Nantes (LS2N) – Université de Nantes, Ecole Centrale de Nantes, Centre National de la Recherche Scientifique : UMR6004, IMT Atlantique Bretagne-Pays de la Loire – Université de Nantes – faculté des Sciences et Techniques (FST)2 Chemin de la HoussinièreBP 92208, 44322 Nantes Cedex 3, France

¹IMT Atlantique (IMTA) – IMTA – 4 rue Alfred Kastler 44307 Nantes, France

³Laboratoire des Sciences du Numérique de Nantes (LS2N) – LS2N – 4, rue Alfred Kastler 44307 Nantes, France

Abstract

The Service Network Design and Routing Problem (SNDRP) integrates long-haul and local transportation planning in a logistics hub network. Delivery paths are to be planned for a set of commodities, via a pre-defined set of routes in the service network. Each commodity has to be picked up and delivered in time, while the total transportation and consolidation cost should be minimized. We extend the Dynamic Discretization Discovery algorithm that has been recently proposed to solve the Service Network Design problem. We show that the SNDRP can be solved with a very thin time discretization on a time-space network. A case study in the retail area is used to illustrate how our approach can help decision makers to design and operate collaborative transportation networks.

Keywords: Service network design, consolidation, synchronization, vehicle routing

*Speaker

†Corresponding author: fabien.lehuede@imt-atlantique.fr