
A Decision Support System for Attended Home Services

Bruno P. Bruck*¹, Filippo Castegini², Jean-François Cordeau³, Manuel Iori², and Tommaso Poncemi⁴

¹Universidade Federal da Paraíba (UFPB) – Centro de Informática - Rua dos Escoteiros, s/n - Mangabeira, João Pessoa - PB, 58055-000, Brazil

²Università degli Studi di Modena e Reggio Emilia [Reggio Emilia] (UNIMORE) – Via Amendola 2, 42122 Reggio Emilia, Italy

³HEC Montréal – Canada

⁴Iren SpA, External and Metering Operations – Italy

Abstract

This work presents a decision support system to address a practical attended home services problem faced by Gruppo Iren, an Italian distributor of electricity, gas and water. The company operates in several regions across Italy and must optimize the dispatch of technicians to customer locations where they carry out installation or maintenance activities within time slots chosen by the customers. The system uses historical data and helps managers to divide regions into clusters based on the minimum travel time among towns, to create weekly time slot tables for each cluster and evaluate them dynamically within a rolling horizon approach, and to simulate and visualize optimal technician routing plans in order to analyze results under different scenarios. The system uses a previously developed integer linear programming tool to specify the amount of resources allocated to each region in each time slot and to route technicians in a cost-effective way. This tool has been modified to fit new quality of service constraints and to design an automated instrument for solving multiple-tasks problems. Computational experiments carried out on data provided by the company confirm the efficiency of the proposed methodology.

Keywords: Attended home services, time slot management, routing, decision support system, simulation

*Speaker