Hexaly Studio: a platform for optimization prototypes and applications

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Hexaly Optimizer is a global optimization solver that combines exact and heuristic methods to find near-optimal solutions in minutes. Hexaly Studio[1] is a web application released in 2023 and built on top of Hexaly Optimizer. It includes a code editor for writing and debugging optimization models, as well as a graphical interface for visualizing solutions. The optimization is done remotely on dedicated servers with Hexaly Optimizer. In this talk, we will give a demo of Hexaly Studio and show how it can be used in industry or for teaching to develop quick prototypes and deploy them in production in minutes.

Hexaly Studio

Hexaly Studio is an online code editor that combines a dynamic programming language with modeling features. The studio comes with a collection of models for classical operations research problems and a generator for complex variants of routing and scheduling problems. A Hexaly Studio user can write their own model or modify an example to connect their data, add custom constraints, and objectives. The optimization is performed remotely on a dedicated server by Hexaly Optimizer using a combination of exact techniques and heuristic approaches. Finally, the solution is transferred back to Hexaly Studio and can be visualized through graphical widgets in a dashboard. Several widgets are available for route visualization, activity planning, and displaying indicators, among other purposes. Once the prototype phase is complete, the mathematical model can be directly imported into an application through Hexaly Optimizer's API or accessed directly via a REST API call.

Hexaly Studio x Air Liquide: A Semi-Industrialized Tactical Tool for Home Healthcare Logistics

Air Liquide R&D presents a tactical optimization tool designed for internal homecare delivery logistics—a complex, country-specific blend of "milk round" and spot activities serving over 2.1 million patients in their homes. Managing this activity is a significant operational challenge: it requires strictly respecting patient visit plans scheduled at predetermined frequencies (ranging from daily to monthly), while coping with an environment characterized by fluctuating patient density and shifts in medical prescriptions.
Developed using Hexaly Studio, the tool provides our small-but-skilled community of logistics coaches with a platform to evaluate existing route structures and assess the impact of territory adjustments or organizational changes. This technical choice served as a pragmatic bridge to transform an R&D model into a semi-industrialized solution, without the need for the investment typically required to develop a custom application from scratch.
While straightforward, the interface allows users to iteratively refine the targeted scenario by adjusting soft and hard constraints—such as overtime quotas, vehicle capacities, and route districting—to ensure that mathematical efficiency remains aligned with operational common sense. For instance, to minimize implementation friction, users can balance operational efficiency against the need to keep patient delivery days as stable as possible. This approach has already been successfully deployed across several subsidiaries, serving as both a guide and a catalyst for data-driven decisions.

Biography

Before launching Hexaly, Thierry headed the Operations Research (OR) team at Bouygues, one of the biggest French public corporations. Graduated from École Polytechnique, he holds a Ph.D. in computer science from Avignon University (2004) and a Habilitation from Nantes University (2014). He has published papers in top OR journals. Several awards distinguished his research: 2005 Doctoral Prize for Innovative Applications by the French Computing Society, 2006 Robert Faure 3rd Prize by the French Operations Research Society (ROADEF), and finalist of the 2012 EURO Excellence in Practice Award.
Michele Quattrone is an OR Engineer within the Industrial Performance group at Air Liquide R&D. For twenty years, he has worked on product distribution logistics across the Group's diverse supply chains—spanning industrial cylinders, bulk liquids, and energy. His focus remains on bridging the gap between mathematical modeling and the reality of industrial operations. Michele is also a member of the organizing committee for the EURO Practitioners' Forum.

[1] https://studio.hexaly.com