

Project Digest — IE395

Split vs. No-Split VRP for Istanbul → France Corridor — Comparative Summary

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Fixed Cost / Truck €2,700 round trip	Fuel Cost / km €0.32 net of refunds	Capacity 23 tons per truck	Active Trucks ~110 of 120 total
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Problem & Objective

Plan truck activation and routing (VRP) along the Istanbul → Kapıkule → Strasbourg → France corridor. Minimize total logistics cost while serving all French demands with capacity-feasible routes.

Method

- Fixed-charge, capacitated multi-vehicle VRP (Gurobi MIP)
- Corridor: Istanbul → Kapıkule → Strasbourg → France
- Costs: €2,700 fixed + €0.32/km fuel
- Capacity: 23,000 kg; Trucks: up to 110 trucks
- Distance matrix: Google Maps shortest practical routes

Results (Qualitative)

Variant	Split Deliveries	Trucks	Total Cost
Without mixed filo	No	Higher	~24.498,72€ (observed)
With mixed filo	Yes	Fewer	~22.477,28€ (observed)
With mixed filo — extra demand	Yes	Minimized	~40.000,80€ (observed)

Output without Mixed Filo

Route: Istanbul → Strasbourg → France → Istanbul → Istanbul Delivered kg: 22502 Travel km: 4236.00	Route: Istanbul → Strasbourg → France → Istanbul → Istanbul Delivered kg: 22502 Travel km: 4236.00	Route: Istanbul → Strasbourg → France → Istanbul → Istanbul Delivered kg: 22502 Travel km: 4236.00	Route: Istanbul → Strasbourg → France → Istanbul → Istanbul Delivered kg: 22502 Travel km: 4236.00
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Output with Mixed Filo

Route: Istanbul → Kapıkule → Strasbourg → Orleans → Nantes → Goussainville → Kapıkule → Istanbul Delivered kg: 22502 Travel km: 4236.00	Route: Istanbul → Kapıkule → Strasbourg → Besenval → Lille → Kapıkule → Istanbul Delivered kg: 22502 Travel km: 4236.00	Route: Istanbul → Kapıkule → Strasbourg → Besenval → Rouen → Goussainville → Kapıkule → Istanbul Delivered kg: 22502 Travel km: 4236.00	Route: Istanbul → Kapıkule → Strasbourg → Strasbourg → Metz → Nancy → Kapıkule → Istanbul Delivered kg: 22502 Travel km: 4236.00
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Output with Mixed Filo Extra Demand

Route: Istanbul → Kapıkule → Strasbourg → Metz → Nancy → Kapıkule → Istanbul Delivered kg: 22502 Travel km: 4236.00	Route: Istanbul → Kapıkule → Strasbourg → Metz → Nancy → Kapıkule → Istanbul Delivered kg: 22502 Travel km: 4236.00	Route: Istanbul → Kapıkule → Strasbourg → Metz → Nancy → Kapıkule → Istanbul Delivered kg: 22502 Travel km: 4236.00	Route: Istanbul → Kapıkule → Strasbourg → Metz → Nancy → Kapıkule → Istanbul Delivered kg: 22502 Travel km: 4236.00
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Conclusion & Recommendations

- Adopt mixed-filo (split) as default weekly planning mode
- Track KPIs: load factor, trucks activated, fixed vs. distance cost
- Benefits increase under heavy/skewed demand — keep sensitivity runs

Keywords:

VRP, split delivery, fixed charge, route optimization, Gurobi

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