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# Case Studies Across Industries

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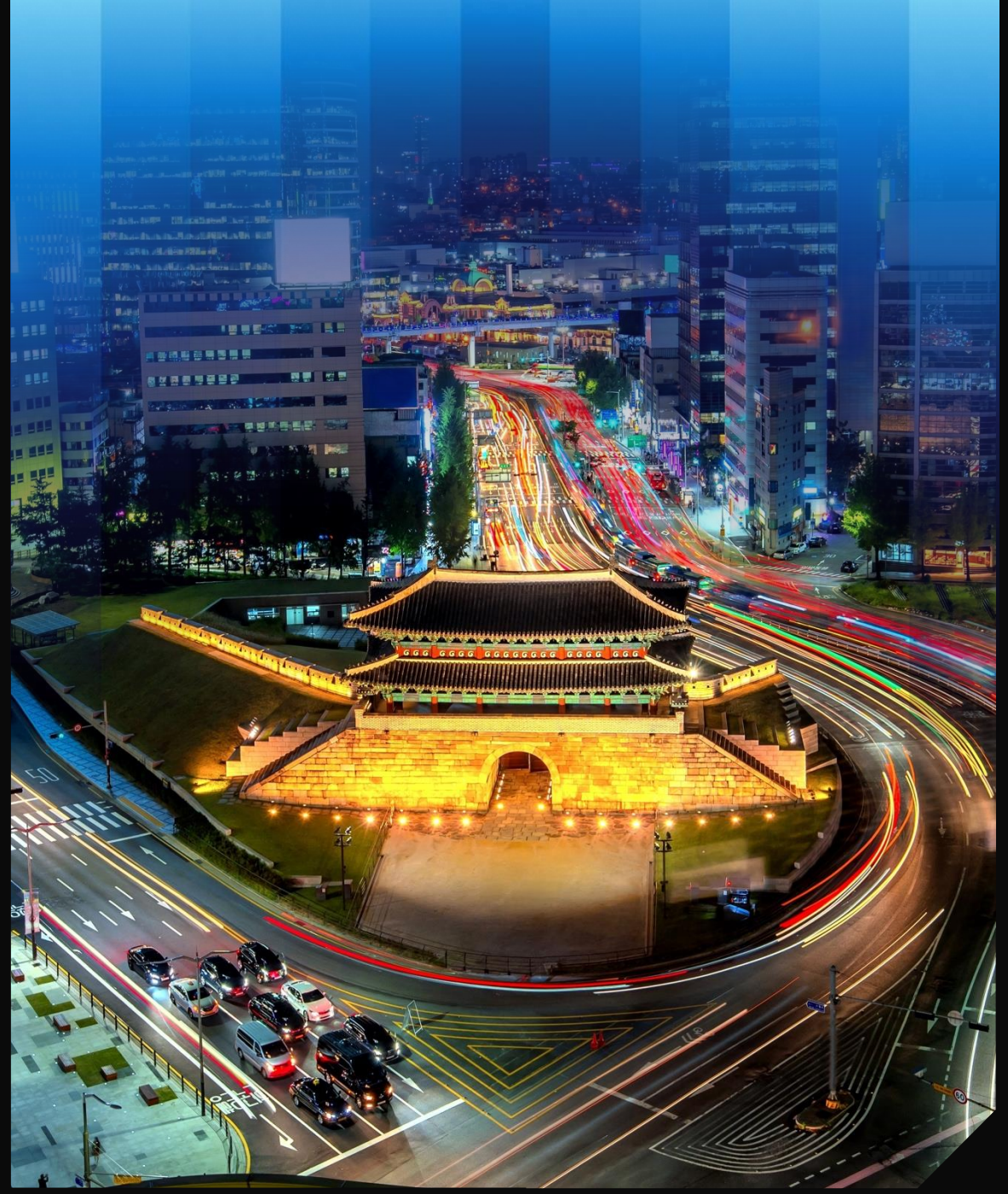
Technical Account Management - APAC



# Agenda

01 Global Footprint & Industry Distribution

02 Industry Overview

03 Case Study Analysis

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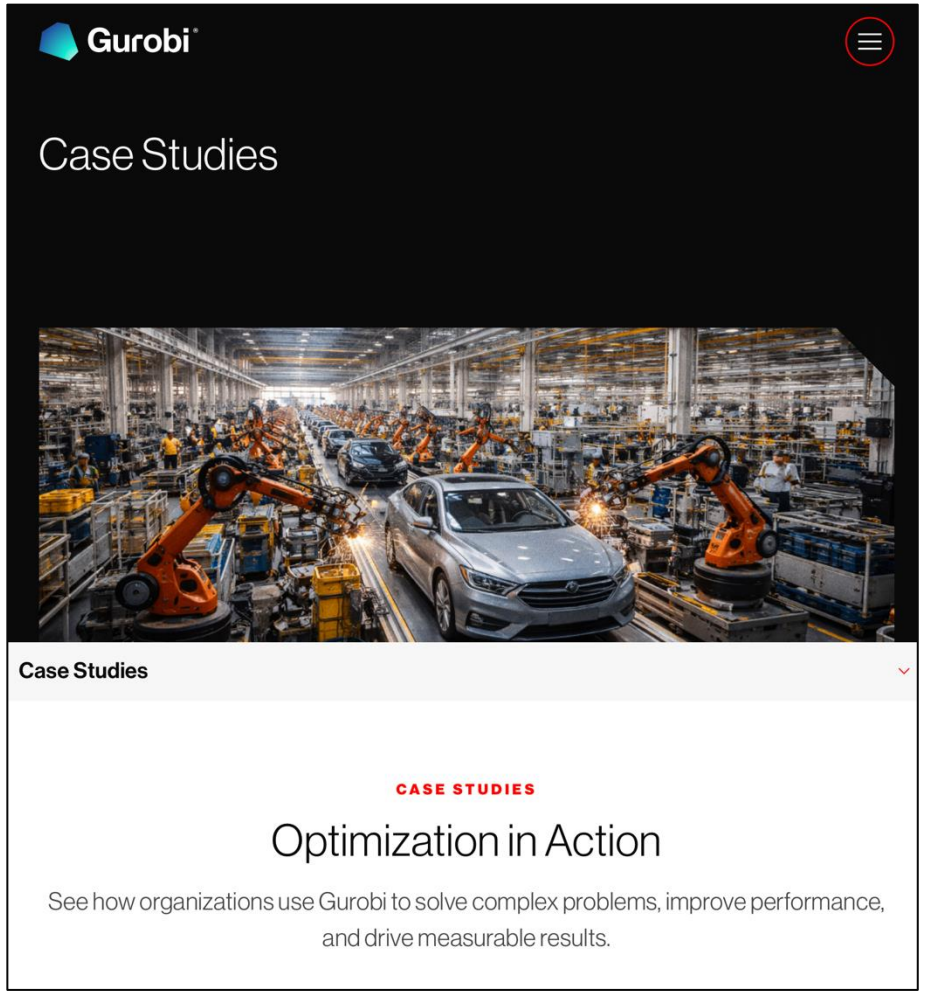
# Use Cases & Customer Case Studies

- Advertising and Marketing
- Aviation
- Automotive
- Chemicals & Petroleum
- Consumer Products
- Continuous Production
- Finance & Banking
- Food & Beverage
- Government
- Healthcare
- Industrial Automation and Machinery
- Manufacturing
- Metals, Materials, and Mining
- Power and Utilities
- Pulp and Paper
- Research
- Semiconductor
- Software
- Sports and Recreation
- Supply Chain
- Telecommunications
- Transportation
- Workforce Scheduling

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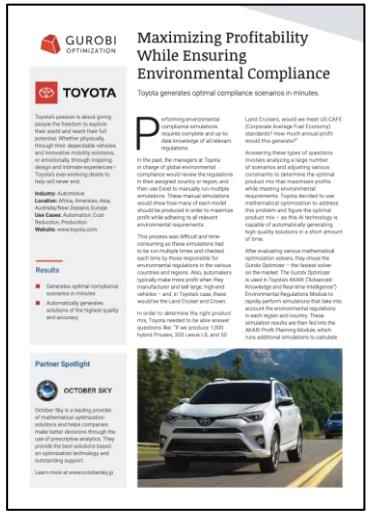
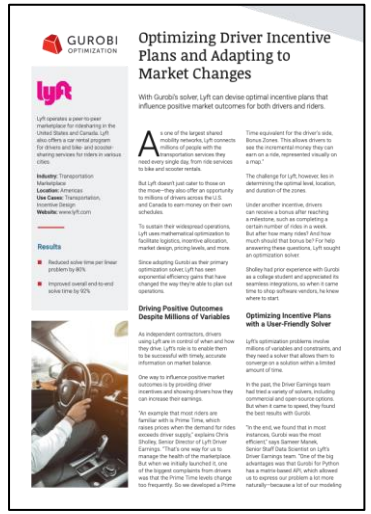
# Use Cases & Customer Case Studies



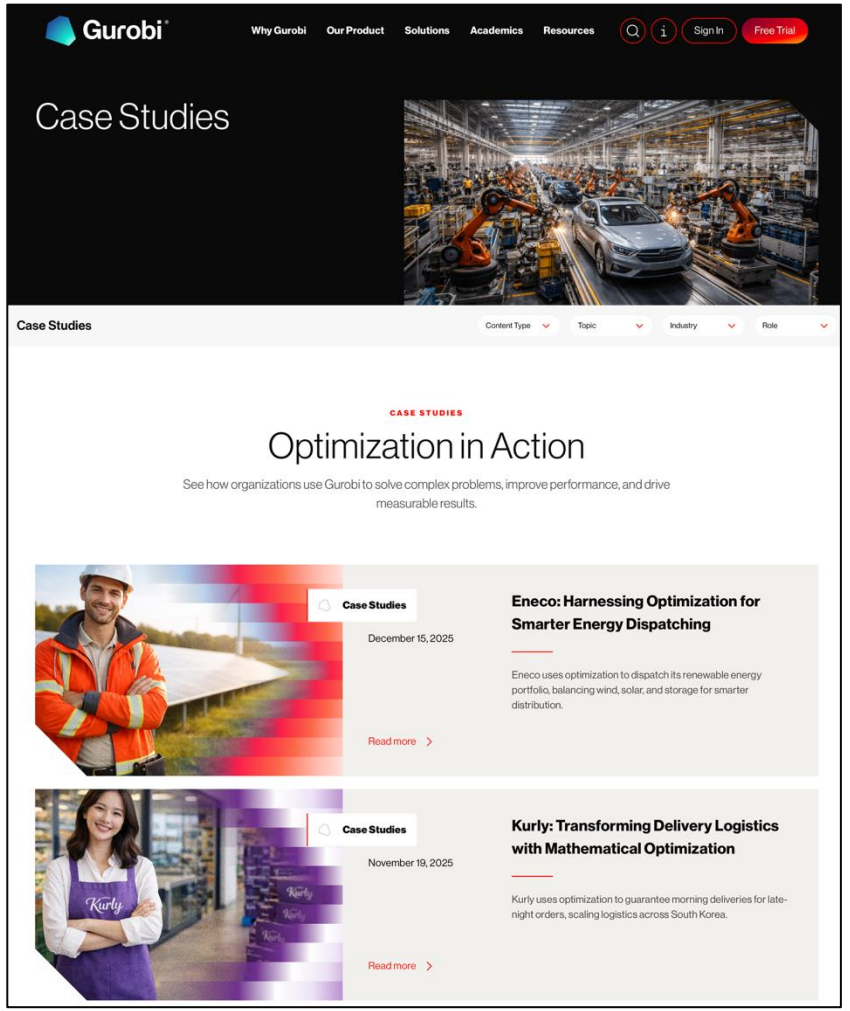













… 100+ case studies

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# Industry Overview

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# Energy / Power & Utilities

From long-term investment to real-time dispatch — optimization across every energy decision

| Decision Horizon | **Strategic Investment** | **Operations Planning** | **Short-term Dispatch** | **Real-time Trading** |
|---|---|---|---|---|
| Description | Capital investment planning for resilient, low-carbon infrastructure | Balancing generation, hydro, and renewables across seasonal horizons | Optimizing which assets run, when, and how much — hour by hour | Maximizing revenue and managing risk in volatile energy markets |
| Application | • Capacity Expansion<br>• Network / Grid Design<br>• BESS Feasibility<br>• Resilience Planning | • Generation Planning<br>• Water Resource Opt.<br>• Maintenance Scheduling<br>• Renewable Balancing | • Unit Commitment<br>• Hydro Scheduling (Short-term)<br>• BESS Dispatch<br>• DER Management | • Energy Market Trading<br>• Bid Price Optimization<br>• Portfolio Risk Management |
| Case Studies | Statkraft (BESS) / Quanta (Grid) / RWTH (Multi-energy) / RITE (Carbon policy) / encoord (Network) | TEA / Alpiq (Hydro) / J-POWER (Renewable) / Water Corp. / Tokyo Metro Univ. (Water Supply) | AMS (BESS) / Alpiq (Hydro) / Polymathian VOLT / Ogimoto Lab / Eneco (VPP) | SESCO / Avista |

# Retail & Consumer

Optimization you experience as a consumer every day — from pricing to your doorstep

| Stage | **Assortment & Curation** | **Pricing Optimization** | **Mktg. & Engagement** | **Operations & Fulfillment** |
|---|---|---|---|---|
| Description | Deciding which products to offer to which customers | Setting prices that maximize revenue across products and time | Targeting the right customers with the right message and budget | Executing orders, assigning shoppers, and scheduling staff for efficient fulfillment |
| Application | • Product-Customer Matching Optimization<br>• Subscription Service Curation | • Dynamic Pricing<br>• Markdown / Season-end Optimization<br>• Real-time Grocery Pricing | • Email Campaign Optimization<br>• Online Ad Bidding Optimization | • Order Batching Optimization<br>• Shopper Assignment<br>• Workforce Scheduling |
| Case Studies | Birchbox (Princeton Consultants) | Blue Yonder / Luca / Veltys | Emesa / BrainPad (October Sky) | Instacart / Kurly / Workforce Analytics |

# Supply Chain & Logistics

From network design to last-mile delivery — optimization across the entire supply chain

| Decision Horizon | **Strategic:** Network Design | **Tactical:** Supply & Inventory Mgmt | **Operational:** Transportation Execution | **Special Applications** |
|---|---|---|---|---|
| Description | Where to locate facilities and how to structure the supply network | Balancing supply with demand across time, location, and uncertainty | Routing vehicles and deliveries at minimum cost and maximum speed | Asset logistics and industry-specific end-to-end supply chain optimization |
| Application | • Facility Location<br>• Districting & Territory Design<br>• Global Supply Chain Network Optimization | • Integrated S&OP<br>• Multi-echelon Inventory Optimization<br>• Supply Chain Risk Management | • Vehicle Routing (VRP)<br>• Last Mile Delivery Optimization<br>• Transportation Planning Automation | • Asset & Cash Placement<br>• Mine-to-Market Optimization<br>• Pharma Supply Chain |
| Case Studies | Kurly / Posten Bring / Suzano | SAP / Pharmaceuticals (ICRON) / Mars / Fonterra | Mondelez (Arute) / Lean Logistics (e2open) / Delhivery / Suzano | Arute Solutions / Wincor Nixdorf / Polymathian RACE / Polymathian BOLT |

# Before Gurobi: What Pushed Companies to Act

## 1. Manual Process Limits

| | |
|---|---|
| • Audi | 8 people, 3 weeks → seconds |
| • YOKU MOKU | 600 hrs/yr plans → 1 day |
| • Yutong Bus | 9-hour planning → 45 min |
| • KLM | 1 scenario/week → 20–30/week |
| • Birchbox | 30–50 hours matching → 10 min (99%↓) |

## 2. Scale/Complexity

| | |
|---|---|
| • SAP | 20M → 1.7B variables |
| • NFL | Schedule options: 5 → 10,000+ |
| • 55ip | 100,000+ portfolios/month |
| • Emesa | Emails processed: 10K → 1M/week |

## 3. Existing Solver Insufficient

| | |
|---|---|
| • Hewlett Packard | vs. open-source: 5,000× faster |
| • Water Corporation | vs. open-source: 600× faster |
| • Arute Solutions | vs. commercial solver: 190× faster |
| • Avista Utilities | vs. commercial solver: 50× faster |
| • Fonterra | Other solver: no solution found |

## 4. Real-Time Processing

| | |
|---|---|
| • Lyft | Real-time incentives, 92%↓ solve time |
| • Instacart | Millions of orders — uninterrupted |
| • Eneco VPP | 10 min → 40 sec, 99.9% uptime |
| • Luca | Real-time pricing: 30 min → seconds |

# Manufacturing

From raw materials to delivery — optimizing every stage of the production

| Value Chain | **Sourcing & Blending** | **Production Planning & S&OP** | **Shop Floor Scheduling** | **Sales & Distribution** |
|---|---|---|---|---|
| Description | Getting the right inputs at the right cost before production begins | Aligning production targets with demand, capacity, and inventory | Sequencing jobs, machines, and materials on the production floor | Getting finished goods to customers efficiently |
| Application | • Raw Material Blending<br>• Supplier Selection & Procurement | • Sales & Operations Planning (S&OP)<br>• Product Mix Optimization<br>• Demand-driven Production Planning | • Assembly Line Sequencing<br>• Job Shop Scheduling<br>• Cutting / Nesting Optimization | • Sales Route Optimization<br>• Production-Sales Alignment |
| Case Studies | Tata Steel / Aimpoint | Vestel (ICRON) / Toyota (October Sky) / Yutong Bus | Audi / Pentair / Kaneka / Kvaerner / YOKU MOKU CREA | Cosentino |

# Airlines & Aviation

The most mature industry in Operations Research — optimization at every altitude

| Operations Domain | **Fleet & Network Planning** | **Crew Planning** | **Airport Operations** | **Flight Training & Simulation** |
|---|---|---|---|---|
| Description | Matching aircraft to routes and schedules over weeks and months | Assigning crew to flights within duty, rest, and qualification rules | Allocating airport resources and staff across daily operations | Scheduling pilot training on simulators under regulatory constraints |
| Application | • Timetable Planning<br>• Fleet Assignment<br>• Tail Assignment<br>• Maintenance Routing | • Crew Pairing<br>• Crew Rostering<br>• Annual Vacation Scheduling<br>• Long-term Workforce Planning | • Resource Allocation (Gate, Stand, Check-in Counter)<br>• Ground Operations Scheduling (Staff & Handling) | • Simulator Scheduling (Operational)<br>• Pilot Training Planning (Strategic) |
| Case Studies | Air France | KLM (BCG) / Rosterize (crew scheduling ISV) / Hitit (airline IT vendor) | Copenhagen Airport / Geneva Airport (Eurodecision) / Swissport | Lufthansa Flight Training (Optano) |

# Financial Services

Where a 1% difference creates billions in value — optimization at the speed of markets

| Business Domain | **Institutional Asset Management** | **Capital Markets & Trading** | **Retail & Personal Finance** | **Financial Infra. & Operations** |
|---|---|---|---|---|
| Description | Large-scale portfolio optimization under risk & regulatory constraints | Optimizing trade matching via combinatorial auctions | Personalized, tax-optimized financial planning for individual investors | Optimizing financial operations — from cash logistics to capital allocation |
| Application | • Fixed Income Automation<br>• Private Banking Customization<br>• Risk/Regulatory Portfolio Opt. | • Order Matching Optimization | • Tax-Efficient Investing<br>• Retirement Income Optimization<br>• Withdrawal Sequencing | • ATM / Cash Management<br>• Enterprise IT / R&D Budget Allocation |
| Case Studies | Robeco / swissQuant | OneChronos | 55ip (acq. by JP Morgan) / MyGoals | Arute Solutions / Wincor Nixdorf / Hewlett Packard |

# Beyond the Solver: Business Outcomes at Scale

## Dollar-Value Impacts

**$20B** — FCC (2018 Franz Edelman) — Spectrum auction revenue

**$2.8B** — Princeton / US Census — Federal spending saved

**$100M+** — Hewlett Packard — Profit generated

**$70M+** — Copenhagen Airport — Investment savings

**$1.5M/yr** — Metallurgical Additives — Annual savings

**$1M/yr** — Swissport — Scheduling savings

## % / Social Impacts

**Revenue +5%, Inventory -20%**
Blue Yonder · Supply chain

**Gross margin +15%**
Polymathian VOLT · Energy / utilities

**Portfolio return +1% (vs. commercial solver)**
swissQuant · Asset management (AUM-leverage)

**Revenue +12–25%**
Statkraft BESS · Energy storage

**~1,820 lives saved**
Chilean Government · COVID medical resources (2022 Franz Edelman)

# Transportation & Mobility

Optimization exists everywhere people and goods move — on rails, roads, and beyond

| Operations Domain | **Network & Infrastructure** | **Dispatch & Routing** | **Workforce Scheduling** | **Real-time & Platform Mobility** |
|---|---|---|---|---|
| Description | Large-scale portfolio optimization under risk & regulatory constraints | Directing vehicles and drivers at minimum cost and maximum speed | Assigning transportation staff to shifts and routes within regulatory limits | Optimizing financial operations — from cash logistics to capital allocation |
| Application | • Train Operations Planning<br>• Airport Infra. Planning<br>• Urban Air Mobility Network Design | • Vehicle Routing (VRP)<br>• Car Rental Pricing & Fleet Placement<br>• Last-Mile Delivery Optimization | • Crew Pairing & Rostering<br>• Train Driver Daily Scheduling<br>• Ground Staff Shift Scheduling | • Driver Incentive Optimization<br>• Smart Parking Route Optimization |
| Case Studies | SNCF (French Railways) / Uber Elevate / Copenhagen Airport | Sixt Portugal (LTPLabs) / Delhivery | Rosterize (crew scheduling ISV) / Deswik / Swissport / Geneva Airport | Lyft / EasyPark |

# Sports, Scheduling & Public Sector

The same mathematics that schedules the NFL also saves lives — optimization knows no boundaries

| Problem Type | **Sports League Scheduling** | **Scheduling Automation** | **Humanitarian & Public Health** | **Government & Public Planning** |
|---|---|---|---|---|
| Description | Building fair, profitable schedules within complex constraint systems | From staff rosters to camp programs — manual scheduling automated in minutes | Allocating limited resources to save lives and respond to crises | Optimizing public sector decisions across infrastructure, education, and defense |
| Application | • Season Schedule Optimization<br>• Stadium Resource Scheduling | • SME Workforce Roster Optimization<br>• Camp & Activity Scheduling | • Disaster Relief Pre-positioning<br>• Public Health Resource Allocation | • School District Planning<br>• Military Logistics Optimization<br>• Public Resource Allocation & Planning |
| Case Studies | NFL (American Football) / Beko BBL (German Basketball) | Complevo / Campify | ESUPS (disaster relief NGO) / Chilean Gov. / PATH (global health NGO) | Water Resources SE / Portland Schools / Dstl (UK gov. agency) / FCC (US telecom regulator) |

# What 100+ Cases Taught Us

## 1 Optimization adoption starts from pain, not inspiration

Across 100+ case studies, a consistent pattern emerges: adoption was driven by pain, not curiosity.

The trigger was not "we should try optimization"
— it was **"we can no longer continue this way."**

## 2 Speed improvement is a strategic capability shift, not just efficiency

100× faster ≠ 100× efficient.
**The range of possible decisions expands.**

KLM: 1 → 20–30 scenarios/week
= a different kind of strategic planning altogether

## 3 Every industry has optimization problems — they just haven't found them yet

**Energy, supply chain, manufacturing, finance, chemicals & petroleum, public sector, etc.**
— common thread: "decision-making under constraints."

## 4 Solver choice determines business outcomes

190×–5,000× speed difference, a binary question:
real-time ops possible or not,
strategic exploration possible or not

Fonterra: other solvers found no solution
→ **only Gurobi produced an optimal answer**


# Thank You

For more information, visit gurobi.com