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Why Supply Chain Optimization Projects Fail or Succeed

Best Practices for Network Design & Optimization

AnyLogistix Conference

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Practical best practices from real supply chain design and optimization projects.

Most projects don’t fail because the math is wrong.

01 The baseline didn’t match reality

02 Most project time shifts to diagnosing data issues caught too late.

03 Transportation logic was wrong

04 Wrong rates, wrong units, wrong capacity — false savings.

05 The model answered the wrong question

06 Scenarios ran. No one knew which key decision to make.

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Optimization is a business alignment process.

When the Optimization Worked - and the Answer Was Wrong

What everyone believed

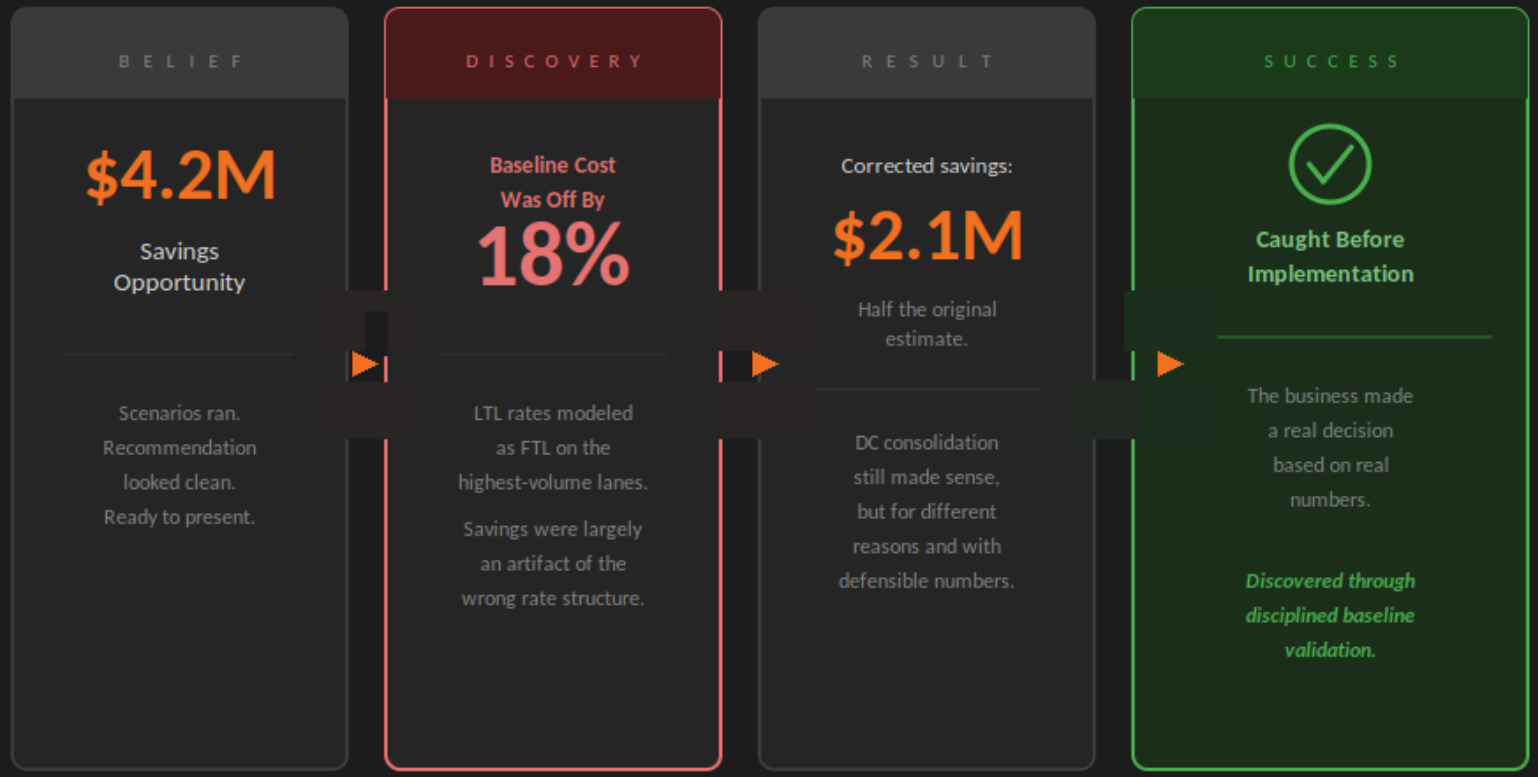
$4.2M savings opportunity identified. Scenarios ran. Recommendation looked clean. Ready to present.

What the model revealed

Baseline transportation cost was off by 18%. LTL rates had been modeled as FTL on the highest-volume lanes.

What changed

Corrected savings: $2.1M - half the original estimate. The DC consolidation still made sense, but for different reasons and with numbers the business could defend.



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The project succeeded because the error was caught before implementation. The business made a real decision based on real numbers.

Four Things That Break Every Optimization Project

Get any one of these wrong and the recommendation fails.

01 Wrong Question

The model is built before anyone agrees on what decision it must support.

02 Wrong Data

The data is incomplete, inconsistent, or in the wrong unit — and no one checks until the baseline fails.

03 Wrong Baseline

Transportation is modeled incorrectly. The savings are real in the model and wrong in the business.

04 Wrong Interpretation

Scenarios run. No one connects the output to the actual business decision on the table.

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Who Is This For?

If you design, optimize, or invest in your supply chain network — this session is built for you.

01 You are looking for a solution

You need to redesign or optimize your network and want a proven, practical approach

02 You are comparing tools & vendors

You are evaluating AnyLogistix and other platforms — and want to tell a real model from a black box

03 You are building the models

You work hands-on in AnyLogistix / network optimization and want practices that hold up on real projects

04 You advise, sponsor or decide

Consultant, analyst or decision-maker who needs results the business can trust

Walk away with a repeatable playbook for network design that is faster, leaner and more trustworthy.

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Where the Effort Really Goes

Three phases quietly eat most of a project — so that is where best practice pays off:

25%

Understand the problem, data & supply chain

Frame the objective, map the network, validate the data

30%

Transportation modeling

Always more than planned: cost policy, capacity, unit conversion

20%

First model run & debugging

Start soft, not hard — let the model expose the data issues

The remaining ~25% goes to scenarios, validation and the final decision.

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Know where the time goes — and aim best practice exactly there.

PART 1 - approx. 25% of total project effort

Understand the Problem, Data and Supply Chain

01 Define a clear objective

02 Build a paper twin and a clear network view

03 The one-page data checklist

04 Product flow, read from the data (Sankey)

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Start by Defining a Clear Objective

Objective statement: We will [make this decision] to [achieve this business goal], measured by [KPI], within [scope & constraints], by [date].

1 The decision

What decision must this project make? Footprint, greenfield, flow, sourcing, or inventory

2 Success metric

How is success measured and ranked? Cost, service %, lead time, CO_2, resilience

3 Business scope

Which products, customers, regions and time horizon are in — or out?

4 Operations scope

Which levers can move? Plants, DCs, vendors, transport modes

5 Baseline & trade-offs

What do we compare against, and what wins when cost and service conflict?

6 Owner & sign-off

Who owns the decision, who approves it, and by when?

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Make it SMART: Specific, Measurable, Achievable, Relevant, Time-bound — and agreed with the decision-maker.

Build a Paper Twin of the Supply Chain

Sit with the client first

Before any tool, draw the supply chain together on paper or a whiteboard

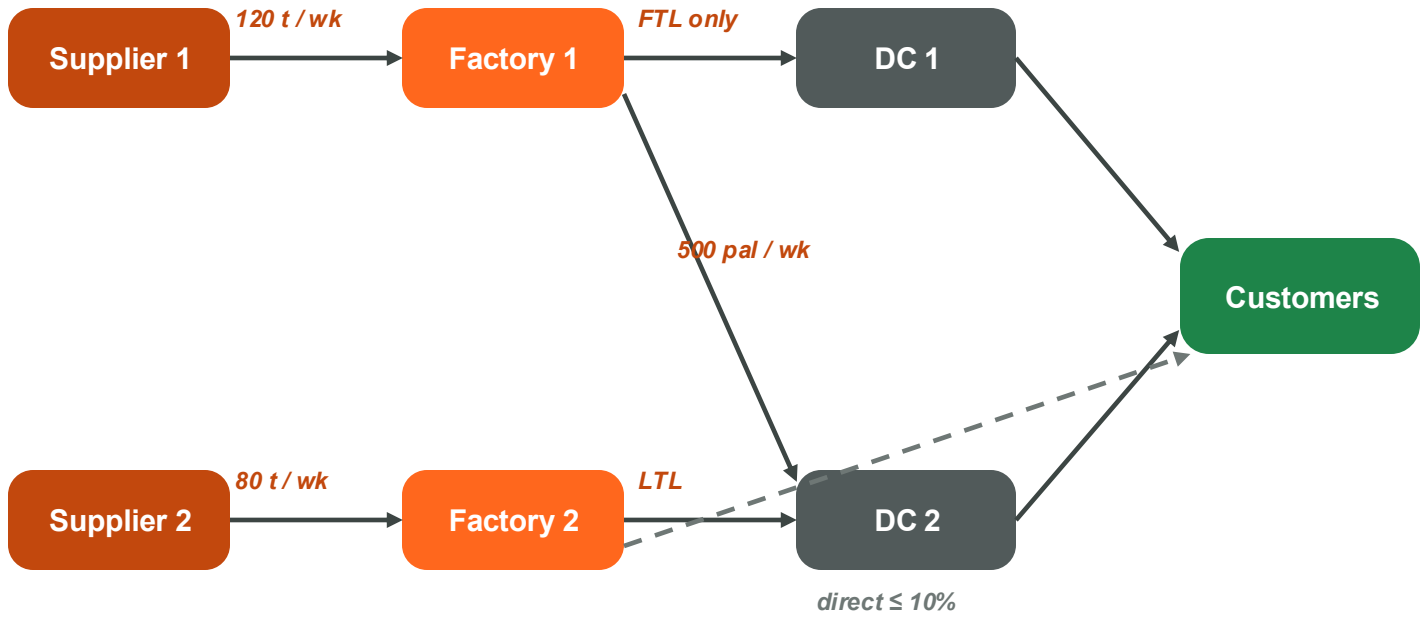
As much detail as possible

Every echelon — suppliers, factories, warehouses, DCs, customers — with flows, volumes and constraints written on the arrows

Blueprint for the model

The baseline model must reproduce this drawing — every validation discussion points back to it

Example sketch — keep it small in slides, big on paper



Factory 2: max 5,000 u / wk — write constraints right on the sketch

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A paper twin of the supply chain: if you cannot draw it, you cannot model it.

Build a Clear Network View

NODES

Physical locations

- Suppliers
- Plants
- Warehouses
- Distribution centers
- Customers

ARCS

Movement lanes

- Transportation lanes
- Allowed flows
- Restricted flows
- Current shipment patterns

ATTRIBUTES

On every node & arc

- Cost
- Distance
- Lead time
- Capacity
- Transport Mode: FTL / LTL / parcel / rail

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A visual network map helps the client validate the model quickly.

Supply Chain Data Checklist

Data Block	What to Collect	Source Data (file & column)	Discussed	Received	Verified	Validated
Customers	Customer list — names, locations (address / coordinates), region & segment	*File: customer_MD › Column ID*	☐	☐	☐	☐
Factories & Suppliers	Plant & supplier list — names, locations, what each makes or supplies		☐	☐	☐	☐
Distribution Centers	DC list — names, locations, storage & throughput capacity, status		☐	☐	☐	☐
Products	SKU list — family, weight, volume, palletization, and selling price		☐	☐	☐	☐
Customer–Product Demand	Demand by customer × product × period, and demand TYPE (recurring, seasonal, one-off)		☐	☐	☐	☐
Transportation Modes	Vehicle types & capacity (pallets / weight / volume); FTL, LTL, parcel, rail		☐	☐	☐	☐
Transportation Lanes & Cost	From–to lanes, vehicle, cost, and POLICY: fixed per trip, distance / product based, or both		☐	☐	☐	☐
Product Flow	How product flows across echelons — read from shipment history (Sankey)		☐	☐	☐	☐
Production Data	Site, products made, BOM & BOM quantity, production capacity and cost		☐	☐	☐	☐
Distribution Capacity	DC storage & throughput limits, handling cost, current utilization		☐	☐	☐	☐
Distribution Constraints	Single-source vs multi-source, allocation rules, service distance, other rules		☐	☐	☐	☐

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Fill Source Data with the file and exact column used. Four checks per block: Discussed → Received → Verified → Validated.

Understand the Product Flow First

Which PRODUCT flows where?

Knowing the sites is not enough — map the flow per product across every layer

Three layers of flow

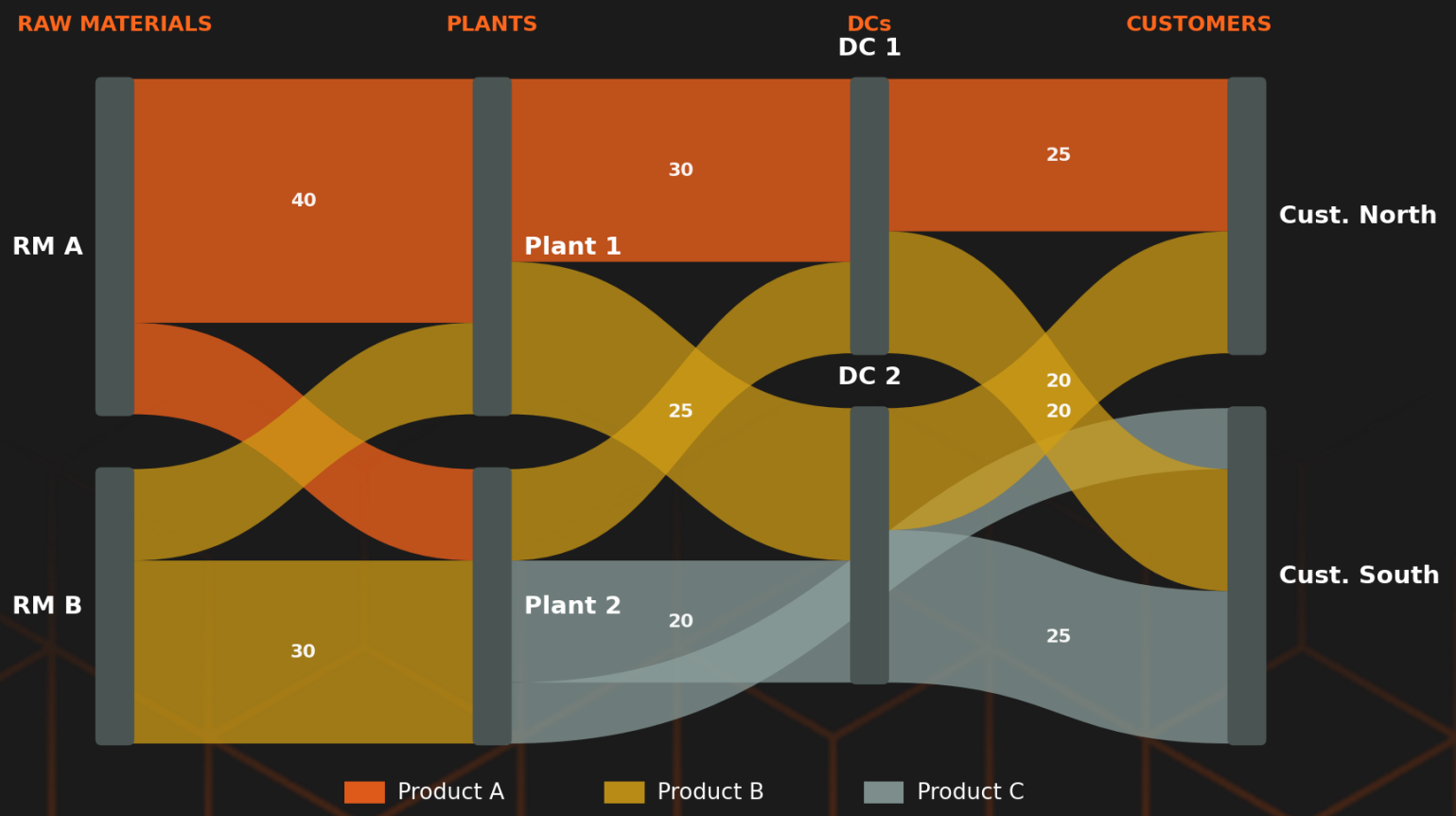
Raw material → intermediate product → finished good. Each layer has its own volumes, lanes and storage points

Read it from the data

Build a Sankey chart from historical shipments — band width = volume, color = product

What it reveals

Main corridors, minor flows, direct shipments, and lanes nobody expected



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A Sankey chart built from shipment data shows which product flows where — at a glance.

PART 2 - approx. 30% of total project effort

Transportation Modeling

01 Validate the real transportation cost

02 Vehicle capacity and unit conversion (FTL vs LTL)

03 Follow the client's real transportation policy

04 Cost the optimized model - new lanes have no rate

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Costing Lanes That Don’t Exist Yet

For the baseline, rates are known. But the optimized model adds new lanes — those rates are not available.

1 Simple distance rate

If the policy is a simple per-km / per-mile rate, apply it straight to the new lanes. Easiest — but it carries strong assumptions

2 Regression / ML model

For a fixed-rate full-truckload (FTL) policy the new-lane rate is unknown. Fit a machine-learning regression on distance, in buckets — and segment by vehicle type

3 Market / industry benchmark

Where possible, use popular market rates or an industry benchmark for the new lanes

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Segment rates by vehicle type — never apply one single rate across different vehicles or lanes.

Transportation Modeling: Get Three Things Right

It always takes more than planned — nail these three before trusting any cost:

1 Validate the real cost

- Fixed per trip, per km, per kg or pallet?
- Minimum charge; FTL vs LTL rate
- Which lanes are actually available

2 Capacity & unit conversion

- FTL: every product needs conversion to the truck capacity unit
- LTL: cost per unit — conversion less critical

3 Follow the real policy

- Model the client's actual rules, not cheapest math
- FTL-only lanes, deliver via DC, preferred carriers

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The cheapest mathematical route is rarely the realistic business route.

PART 3 - approx. 45% of total project effort

Build, Constrain, Run and Deliver

01 Business rules - hard vs. soft

02 Start soft - debug, then harden the constraints

03 Scenario design and baseline validation

04 Validate outputs and deliver the recommendation

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Business Rules: Hard vs. Soft

HARD — must never be violated

- ✕ Facility cannot ship a product it does not handle
- ✕ Closed facility cannot be used
- ✕ Illegal or unavailable lane cannot be used
- ✕ Vehicle capacity cannot be exceeded
- ✕ Regulatory or safety restrictions

SOFT — can be violated with a penalty

- ± Demand shortfall
- ± Minimum throughput
- ± Maximum throughput tolerance
- ± Preferred customer allocation
- ± Target service distance
- ± Current sourcing preference

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Not every business rule should be hard in the first model version.

Soft Constraint Modeling Approach

HARD FORM

Demand served = Demand required

SOFT FORM

Demand served + Unmet demand = Demand required

PENALTY IN OBJECTIVE

Objective = Cost + Penalty × Unmet demand

Use soft early for debugging

- Demand mismatch
- Product flow imbalance
- Minimum throughput
- Maximum throughput
- Capacity tolerance
- Service preference

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Soft constraints help the model produce a result and show where the problem is.

Data Issues Soft Constraints Help Reveal

The first run is a diagnostic, not an answer. It exposes:

01 Missing customer demand

02 Duplicate demand records

03 Wrong facility capacity

04 Missing production capability

05 Missing transportation lane

06 Incorrect product conversion

07 Wrong minimum throughput

08 Unrealistic max capacity

09 Unbalanced inbound / outbound flows

10 Customer assigned to impossible facility

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A first model run should help diagnose the data, not only produce savings.

From Baseline to Scenarios

Historical data → **Baseline** → **Evaluate vs objective** → **Scenarios**

Build & trust the baseline

- Reproduce current operations from historical data
- Match historical demand and finance / invoice cost
- Match throughput and the major lanes
- It is the reference point for every scenario
- Measure it against the objective before moving on

Then design scenarios — each answers a business question

- Facility consolidation · new DC
- Transportation policy change
- Capacity expansion · service improvement
- Demand growth (e.g. +20%)
- Disruption / stress test

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Trust the baseline against the objective first — then every scenario is a fair comparison.

Final Takeaways

Best practices for supply chain design and optimization:

01 Start with a clear objective and a paper twin

02 Validate the data before you model

03 Build a realistic baseline

04 Get transportation cost and unit conversion right

05 Start soft, debug, then harden the constraints

06 Make the recommendation transparent and trusted

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A good supply chain model should be optimal, realistic, explainable, and trusted.

If you need to...

- Save costs in your supply chain
- Evaluate opportunities for expansion
- Solve complex problems

Reach out to explore further.

Scan to connect

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Thank You!

Appendix: Transportation Checklist

Transportation Area	What to Check	Why It Matters
Rate type	Fixed per trip, per km, per mile, per pallet, per kg	Determines cost calculation
Vehicle type	Small truck, trailer, container, rail, parcel	Different capacity and cost
Capacity unit	Pallets, weight, volume, cases	Required for trip calculation
Product conversion	Units to cases, cases to pallets, units to weight	Prevents wrong truck counts
Minimum charge	Minimum billing amount per shipment	Avoids underestimating small shipments
Full truckload logic	Full truckload required or optional	Changes consolidation logic
LTL logic	Partial loads allowed or not	Affects customer delivery cost
Lane availability	Which origins can ship to which destinations	Prevents impossible flows
Carrier policy	Preferred or restricted carriers	Reflects real operations
Routing rule	Direct, hub, cross-dock, milk run	Affects distance and cost
Service rule	Lead time, delivery frequency, customer promise	Prevents unrealistic service

Appendix: Data Checklist Template

Section	Required Fields	Owner	Status
Demand	Customer, SKU, quantity, time period	Sales / Planning	Open
Product Master	SKU, family, weight, volume, pallet info	Master Data	Open
Customer Master	Customer ID, address, coordinates, service level	Sales / Logistics	Open
Facility Master	Plant, warehouse, DC, capacity, status	Operations	Open
Transportation Rates	Origin, destination, mode, carrier, cost	Logistics / Procurement	Open
Lane Matrix	Allowed origin-destination pairs	Logistics	Open
Capacity	Production, storage, throughput, vehicle	Operations	Open
Business Rules	Sourcing, allocation, service, restrictions	Business Team	Open
Baseline Cost	Current logistics cost by category	Finance	Open
Current Flows	Historical shipments by lane and SKU	Logistics / IT	Open