Most Shipping Companies Optimize at the Wrong End of the Supply Chain

Fuel efficiency is where crews think it is: at sea. In reality, it is decided ashore — by people who have almost no visibility into what is actually happening onboard. The gap between what a ship collects and what an office acts upon is where most operators lose millions annually.

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What Crews Measure vs. What Actually Matters

Every modern commercial vessel is instrumented to a degree most industrial plants would envy. A bulk carrier burns **two hundred tonnes of fuel per day** while simultaneously generating thousands of sensor readings — shaft torque, fuel flow, exhaust temperature, vibration, hull condition, weather, sea state, trim, draft.

That data leaves the ship continuously, now, over satellite, and arrives in real time at company offices ashore.

> ⚠ And then almost nothing happens with it.

Most shipping companies treat that telemetry the way they treated noon reports forty years ago: as historical record, not operational instruction. The chief engineer on deck sees the data. The analytics team ashore receives different data, delayed by hours or days, processed into once-per-voyage reports.

The Decision Gap Nobody Sees

The master makes decisions based on experience and schedule pressure. Nobody — crew or shore — sees the gap between what the ship is doing and what it should be doing right now, voyage by voyage.

50–60%

Bunker fuel as share of a vessel's total operating costs — not a detail, but the entire business

The Lever

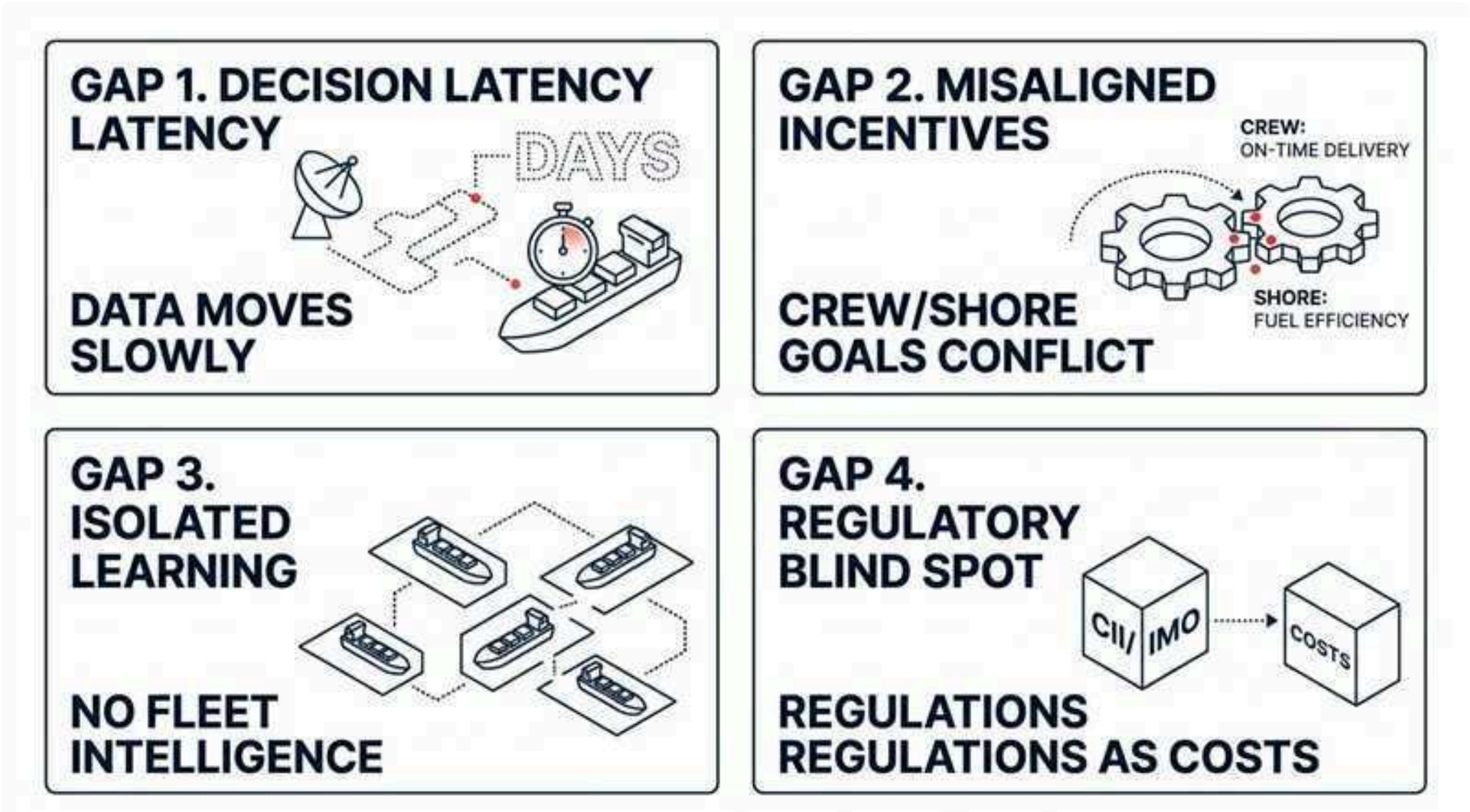
Centralised, continuous, data-driven performance optimisation — the single largest tool for reducing fuel spend

The Gap

Ships have the sensors. Offices have the connectivity. What most companies lack is the organisational structure to close the loop

Four Specific Reasons the Gap Persists

The barrier to converting live vessel data into fuel savings and maintenance efficiency is not technical. It is organisational. This gap exists for four specific, identifiable reasons.



Close Gap #1: Collapse Decision Latency

Data must move from sensor to decision to instruction in hours, not days.

Wärtsilä's Fleet Operations Solution and ABB's remote diagnostics platforms demonstrate this is technically feasible — engine data, AIS, and weather feeds flow into a shore team that recommends speed, trim, and route adjustments with latency low enough to act on them mid-voyage.

Eastern Pacific Shipping's adoption of DeepSea Technology's Cassandra platform showed AI models can forecast fuel consumption with **one percent accuracy**, which means the trade-off between schedule and fuel efficiency becomes calculable rather than assumed.

Most companies have built a reporting centre and called it a fleet performance centre. The competitive winners will build an operational decision-making centre.

Close Gap #2: Align Incentives

Crews measure on-time delivery. Shore measures fuel. These are often opposed. The solution is not to blame crews — it is to create a single optimisation frame that subordinates both to voyage profitability.

1

Crew Priority

On-time delivery and schedule adherence

2

Shore Priority

Fuel efficiency and cost reduction

3

Unified Frame

Voyage profitability — balancing schedule, fuel price, CII, and engine health in a single ML model

4

Outcome

Predictability — knowing what each voyage will cost before it sails

> A machine learning model that accounts for schedule constraint, fuel price, CII regulatory requirement, and engine health — and recommends a single "best speed" that balances all of them — removes the contradiction. Crews execute the recommendation. Shore measures the outcome across the fleet.

The companies doing this — Maersk with Wärtsilä, several Japanese and Korean operators with proprietary systems — gain predictability. Everyone else remains reactive.

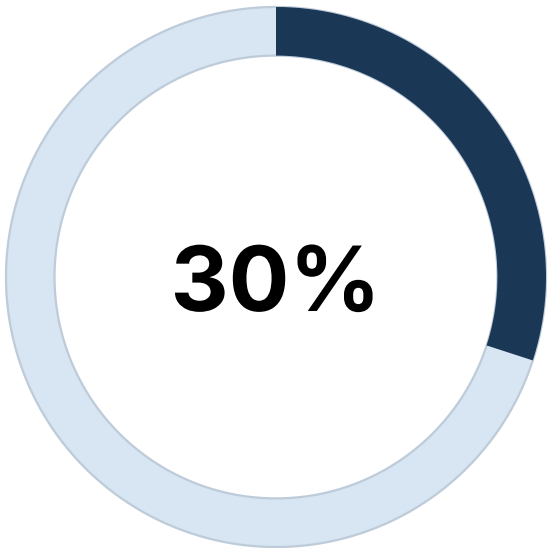
Close Gap #3: Build Fleet-Wide Learning

Single-Ship Intelligence

A single ship's data — even continuous, live data — is still local knowledge. A chief engineer relying on onboard experience will detect bearing degradation at **day fifteen**, after damage has already begun.

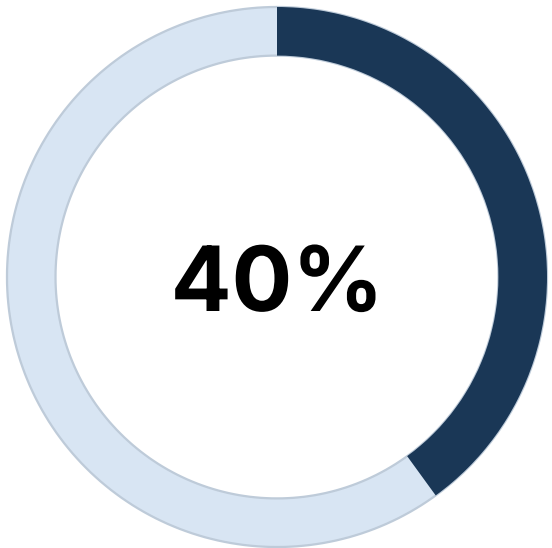
Fleet-Wide Intelligence

A machine learning model trained on shaft vibration profiles from two hundred sister ships will detect bearing degradation at **day eight** — before damage starts. A fleet's data is a statistical asset.



Downtime Reduction

Minimum reduction in unscheduled downtime from properly implemented predictive maintenance across a fleet



Upper Bound

Maximum reduction in unscheduled downtime achievable with centralised data and centralised models

Predictive maintenance, properly implemented across a fleet, also extends component life by months or years. Companies still running isolated optimisation on each vessel leave this entirely on the table.

Close Gap #4: Turn Regulation into Competitive Advantage

The IMO's CII framework tightens every year through 2030. Companies treating this as a cost centre — reduce speed, retrofit, accept margin erosion — will lose to companies treating it as an optimisation target.

Losers: Cost-Centre Mindset

Reduce speed. Retrofit hulls. Accept margin erosion. React to each tightening cycle.

Winners: Optimisation Mindset

Extract efficiency from routing, weather, trim, and speed. Meet CII and preserve profitability simultaneously.

DNV's Maritime Forecast is explicit: carbon-neutral fuels will remain scarce and expensive through the 2020s. Operational and technical efficiency improvements are the realistic lever for meeting near-term decarbonisation targets. The regulatory pressure is the same for all operators. The competitive difference is who builds the organisational capability to turn that pressure into margin.

What Closing These Gaps Actually Requires

Most shipping companies have sensors on their ships. Connectivity between ship and shore is now routine. The barrier is not technical — it is structural.

Closing the data-to-decision gap requires building a shore-based operation that functions as a performance centre, not a back-office reporting function. This is not a software purchase. It is a structural change — one that requires staffing, investment, and organisational commitment at the executive level.

Hours, Not Days

Decision latency must collapse from voyage-end reporting to mid-voyage instruction

One Optimisation Frame

A single model balancing schedule, fuel, CII, and engine health — not competing departmental metrics

Centralised Fleet Data

Fleet-wide learning requires centralised data and centralised models — not isolated vessel optimisation

The Shore-Based Capability Is the Frontier

Most shipping companies do not underestimate their sensor capability. They underestimate their shore-based organisational capability.

> The maritime industry's next competitive frontier will not come from larger ships, newer technologies, or alternative fuels. It will come from the companies that learn to transform the data their ships continuously generate into the operational intelligence that offshore teams can actually act upon.

Predictability

Know what each voyage will cost before it sails

Prevention

Identify maintenance failures before they compound into unscheduled downtime

Profitability

Meet regulatory requirements without sacrificing margin — turning CII into competitive edge

The ship was always capable of generating this data. What separates the operators from the fleet managers is who invests in the shore-based capability to actually use it. That transformation is entirely dependent on building the right structure ashore.

By IONAIRE — operational and industrial advisory across manufacturing, marine, and commercial sectors, with a practice focus on the marine industry's digital and operational transformation. Sources include IMO, DNV Maritime Forecast (2024–2025), Wärtsilä, Riviera Maritime Media, California Management Review (UC Berkeley), and peer-reviewed shipping economics research.