Achieve Safer, More Efficient Voyages with Weather-enhanced Routing Data

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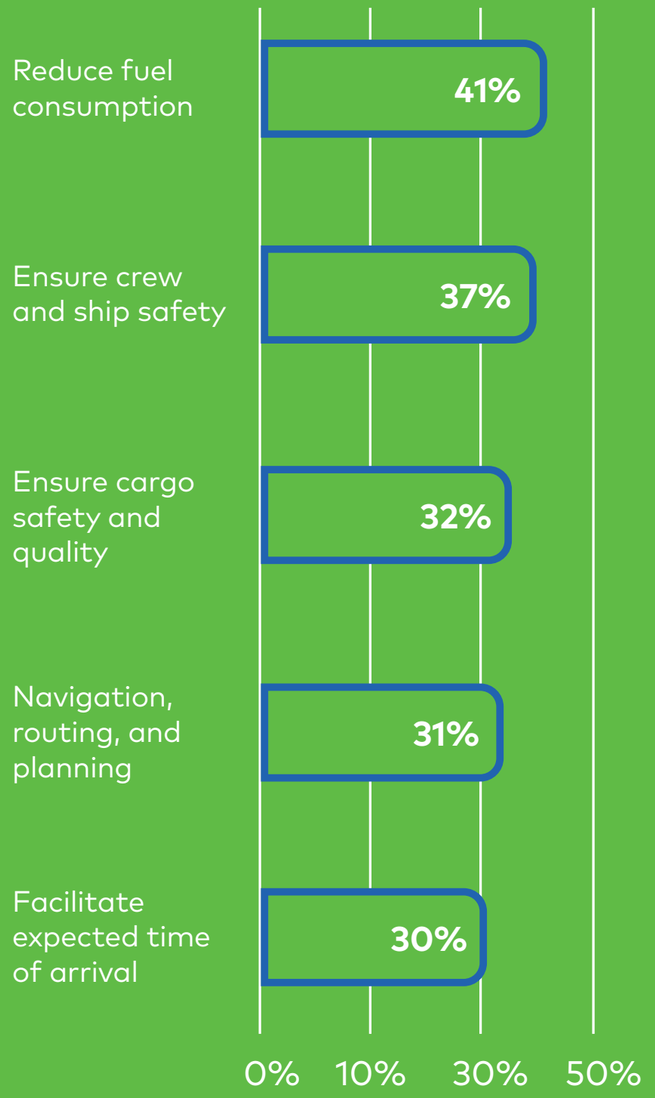
Business drivers for weather data integration



Business drives for weather enhanced use cases. Source: DTN digitalization in shipping report.

When it comes to operational decision-making, the weather is one of the most critical and influential factors for shipping. It's no surprise that many data sources feeding into company systems require weather information. Recent DTN research shows these organizations rely on performance and routing data to enhance fleet decisions and ensure crew, vessel, and cargo safety. Integrated weather data can also help optimize fuel use — which can account for up to half of overall operating costs — delivering significant savings.

Maritime companies already use digital technology and data to improve knowledge of customer behaviors, the competition, and future trends. This information helps them improve their processes and better match their offerings to market demand.

While the weather is a difficult factor to predict, it can also unlock new opportunities and competitive advantages. Accurate, integrated weather data can help optimize routes and operational efficiencies and also plays a crucial role in performance analysis.

Integrated data can also revolutionize how maritime organizations monitor and manage today's increasingly volatile weather conditions. Let's explore how weather-optimized routing technology, like APIs, can help you focus on your core business more closely.

"Weather routing is a vital tool for us to ensure maximum safety for our crews, cargoes, and vessels. It also helps us to save time, money, and, of course, fuel. This is one way we can minimize the environmental impact of our ships. DTN weather routing is used on board of 100 vessels in the Spliethoff Group, and in our office."

– Karel van Zijl, director business innovation and analytics, Spliethoff

1. Why weather-optimized routing is increasingly important

Despite its significant impacts on shipping and the overall supply chain, companies have been slow to integrate weather data into their systems and decision-making tools. Regardless of the many benefits, such integrations are subject to broader digitalization projects, which can be complex, costly, and time-consuming to implement. However, with software-as-a-service (SaaS) platforms making pre-integrated weather data more available, shipping companies can accelerate their digitalization journeys.

A recent industry research report funded by DTN explored the impact of digitalization in shipping, revealing that 91% of shipping experts agree that weather data is necessary. However, only one in 10 have fully-integrated weather data, which means more can be done to tackle current sector challenges.

Supporting greener shipping

"New technologies for greener shipping" is the World Maritime theme for 2022, reflecting the need for the sector to transition into a sustainable future while leaving no one behind. The shift allows shipping companies to focus on sustainable practices, building a better, greener world. One way is to save fuel through enhanced weather routing, which can help reduce emissions, especially when integrated into a broader performance management system. The International Maritime Organization (IMO) actively supports a greener sector transition and showcases industry innovation, research and development, and the demonstration and deployment of new technologies.

Fostering fuel efficiency

Vessel efficiency is essential for ship owners, charterers, and shipping companies to maximize their returns. In particular, reducing fuel consumption can support critical savings — especially with the recent spike in fuel prices. The priority, therefore, is to minimize both transit times and fuel consumption without placing the crew, vessel, and cargo at risk. Reduced transit times and fuel consumption drive cost savings and help minimize cargo and hull damage. With typical fuel savings of $5,000 to $15,000 from optimized routes alone, there are clear opportunities for companies to save money.

For TORM, this approach has saved a minimum of 10%, per voyage, on at least 50% of its voyages. In terms of numbers, TORM ships sail five times a week on average, choosing an optimal sea route, especially when encountering severe weather.

Securing safety

The sector is under considerable pressure from extreme weather, and it can be hard to predict the precise evolution of such events. Most route planning is performed based on specific assumptions, but there must be room for a flexible response to increasingly frequent and severe events.

Scientific research validates those extreme weather-related events have a business impact, yet 74% of respondents in the DTN research report don't think the industry is impacted by changing weather patterns and warming oceans. However, recent incidents indicate that this perception is not correct. The impact of severe weather on vessel and crew safety was recently highlighted when two boats collided during Storm Corrie in January 2022.

Rescue helicopters evacuated the crew from the Julietta D, which was left drifting rudderless due to the incident. The Pechora Star, the other vessel involved, also sustained damage. It was, however, able to continue its voyage.

Cargo is also at risk during severe weather. A 961-foot containership sailing from Bremerhaven, Germany, to Rotterdam recently encountered a storm in the North Sea and reported losing at least 26 empty 40-foot containers overboard. Photos of the incident showed additional boxes hanging from the ship's side, and several stacks collapsed.

At the time, the Dutch Coast Guard and other European authorities issued weather warnings as the fierce storm moved across the region. In the UK, top wind speeds were recorded at 122 miles per hour (mph).

Shipping companies that fail to plan for a changing climate and sea states face operational efficiency and safety challenges, which will only intensify in the future. Therefore, securing the global maritime trade will require investments in digital adaptation and building resilience.

2. Technological advancements unlock new approaches to vessel routing

Increasingly, shipping companies are recognizing the value of new technologies and digitalization in boosting efficiencies and maintaining business continuity in times of disruption. Such technological innovations include advanced analytics, vessel routing APIs, onboard sensors, communications technology, port-call optimization, blockchains, big data, and autonomous ships and vehicles.

These organizations are understandably focused on vessel improvements first, like fuel type and ship engine optimization. But as they attempt to navigate increasingly complex market conditions, combining these existing optimization approaches with weather-enhanced use cases can provide an edge.

Technology and computing power advancements and integration partnerships enable ship operators that choose single systems to immediately access rich data. For example, DTN works with a range of shipping platform developers to provide integrated weather data within existing systems. The market for these SaaS platforms is growing fast, enabling shipping companies to quickly and easily implement integrated decision-making tools and accelerate industry digitalization.

Incorporating weather data into digitalization allows shipping operators to overlay information for complete situational analysis, supporting more confident decisions. Applying this analysis to a fleet of vessels in different locations multiplies the value weather insights provide.

3. Delivering enriched weather data straight to your hands

Although unlocking a new approach to vessel routing sounds very promising, it may sound like a lot of work. As strategic weather data specialists, we've solved the problem with our Vessel Routing API.

Our Vessel Routing API recommends a weather-optimized route that can feed into any application for greater ease of use. It helps you improve situational awareness and safety, increase the accuracy of ETAs, better anticipate potential delays, and cut operational and logistical costs. Powered by advanced AI, it also delivers key metadata for each route, so your team can quickly and easily compare various options. Its versatility provides the flexibility to generate solutions via an endless combination of routing options.

Vessel Routing API allows application builders to innovate beyond traditional use cases. It integrates into client applications with minimal requirements, using scalable, secure, and reliable infrastructure. Enable better decisions across multiple roles:

- Charters can analyze all route options before — and during voyages — and see real ETA calculations that include weather resistance and avoidance data.
- Owners can minimize idle vessel time, maximize performance, adapt routes to reduce greenhouse gas emissions and carbon dioxide, optimize fuel consumption, and advise captains on ideal speeds.
- Ports can see actual ETAs for inbound vessels and benchmark arrival times with better estimates to avoid congestion and maximize port logistics.
- Commodity traders can model the cost of changing vessel speeds and ports on market prices and see how storm systems may affect commodity supplies and prices in specific regions.

Strengthen your confidence in routing optimization by easily integrating our accurate data into your systems. Your team will better anticipate the impacts of weather on vessel performance, supporting improved ETA accuracy, cost control, and reduced fuel consumption. Our Vessel Routing API unlocks intelligent, flexible, and actionable insights, safely empowering informed decisions with minimal, seamless adjustments required.

4. The DTN advantage: essential factors for weather routing success

Getting vessels safely from points A to B while managing costs, meeting KPIs, and maintaining safety are challenging. Optimized weather routing can help you clear these hurdles. With our Vessel Routing API, you can better respond to these challenges, saving money through performance optimization — without compromising safety.

But to make the most of the data, you need the DTN advantage. It's the perfect combination of our unique marine forecasting system, extraordinary routing algorithm, and the experience of our master mariners.

The latest routing evolution is weather-optimized routing. It has all the same safety benefits of traditional weather routing and uses data to advise on routes based on predicted vessel performance. Over the last 10 years, its unique, innovative approach has provided a new level of value to the industry.

Weather-optimized routing is point-to-point, safe route planning. It includes speed and heading recommendations that factor in the impacts of environmental forces on vessel performance. The essential essentials for weather-optimized routing are:

- Weather data
- Vessel profiles
- Unique routing algorithm
- Weather-optimized route network
- Master mariners

Together, these essentials make it possible to offer a genuinely optimized service, supporting real strategy for success.

"If one captain is making seven or eight voyages in a year and has a life expectancy of 30 years of experience, he is not wise. Meteorologists support six to eight vessels in a day and work every day with different seafarers — meaning they have over 220 years of experience. So, extensive knowledge always adds value in the decision-making process."

– Lajos Holmslykke,
performance manager, TORM

5. Delivering real value: how master mariners help you get more from data

Master mariners are fluid in the language of shipping and understand the realities of life at sea. They know what a ship can handle, and the performance levels a vessel should achieve in a given set of circumstances — balancing the guidance provided by the data with real-world experience.

In weather-optimized routing, accurate weather data is only part of the puzzle. Managing uncertainty and risk is also critical, and that's where our master mariners and ex-seafarers can add real value with their navigational knowledge and familiarity with vessel characteristics in various wind and sea conditions. They focus on best practice routing to secure crew and ship safety while maximizing fuel efficiency and decreasing carbon dioxide emissions.

Their knowledge and skills help deliver premium route advice based on navigational features, including obstacles, sea currents, and waters affected by pirates. Plus, they understand the processes onboard the bridge, so they know when it is feasible and practical to issue new routes or speeds.

For example, during a typhoon, standard weather model data alone is insufficient and typhoon data is overlaid to enhance the view. Factors like wind strength, system speed, and intensity can be uncertain and must be accounted for by our master mariners. Since the storm may vary from its current course, the master mariner assesses route options to ensure the vessel won't become trapped by the storm system.

Conclusion

Between the ongoing impacts of the global pandemic, climate change, and economic uncertainty, it is a turbulent time for the world right now. However, new, weather-enabled applications are already helping the industry to solve many of its pressing problems and chart new opportunities.

Vessel Routing API and integrated weather data can strengthen your decision-making confidence and safely optimize your routes. With them, your team can better anticipate weather impacts on vessel performance to improve ETA accuracy, control costs, avoid excessive fuel consumption, and meet critical carbon regulations. Contact us to learn how you can unlock intelligent, flexible, and actionable insights that empower better-informed decisions.

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