The digital journey to voyage optimization

Processing the amount of data necessary to achieve true voyage optimization was once too big a challenge. But thanks to new digital solutions that offer previously unachievable benefits, an increasing number of ship owners and operators are embarking on their digitalization journeys. According to recent research from DTN, since the COVID-19 pandemic began, 47% have accelerated digitalization. Only a few years ago, the idea of vessels connected to the Internet of Things (IoT) was a pipe dream — now, it is a reality.

The holy grail for digitalization is voyage optimization, where everything comes together to support the planning and execution of smooth, safe, and efficient voyages. It's a big challenge that requires bringing together a significant number of data points, running analysis, and acting on the findings. As a result, it's no surprise that there are wide gaps between ship owners and operators in the industry regarding how far along they are on their digitalization journeys.

In this article, we'll look at three areas of digitalization within the shipping sector, including fit-for-purpose data — the next level of shipping data and the key to voyage optimization. Let's get started.

1. How data drives digitalization

Every part of the shipping industry generates data. Whether on dispatch depots, trucks, ports, or ships, sensors record an overwhelming number of data points. Because so much data is generated, shipping operators have yet to be able to use it to its full potential. How do you bring together so much information, process it, and use it to improve your operations without it taking too much time and costing too much money?

These concerns are starting to change thanks to new digital solutions aimed at streamlining data collection and processing. Single systems are convenient and accessible third-party data platforms that operators can purchase and implement with pre-integrated data. And they're constantly improving as providers add new features and harness new technologies. Often, smaller operators find single systems are an affordable, all-in-one alternative to developing a custom system, while larger firms find success in combining their bespoke solutions with new single systems into a hybrid.

Weather information is the cornerstone of shipping data because the weather affects so much else, including performance and routing data. Companies can combine weather data with real-time data from sensors to help them adapt to conditions as they happen. Until recently, companies could only get this information once a day through their noon reports. Now, it's up to the minute.

The thought of reaping the benefits of efficiency, safety, and more through data and tech is driving the race to digitalization.

Digitalization delivers these critical benefits to the maritime industry:

- Improved vessel performance
- Reduced operational costs
- Better crew and vessel safety standards
- Increased regulatory compliance, especially decarbonization
- Greater efficiency in all areas

Available data types from single systems and internal proprietary platforms include:

- Port information
- Weather information
- Vessel data
- Routing data
- Performance data
- Bunker rate information
- Market and cargo intelligence
- News

2. Fit-for-purpose data

If the goal is voyage optimization, fit-for-purpose data is the key to reaching that target. Exclusively offered by DTN, it's the next level of data for route optimization.

Here's how it works. When a ship's captain requests an optimal route from one port to another, the software will return one to the best of its ability. The strength is in optimizing the voyage plan workflow.

However, there are so many different restrictions in force, and optimizing the voyage plan workflow ensures that voyage plan creation is smoother and weather-optimized routing is applied more effectively. Fit-for-purpose data considers the restrictions, including how they affect one another. It streamlines the process, resulting in fewer changes from the captain (straight away, there are no ECDIS escalations). With weather routing, the voyage plan will also change more often, for instance, when a better route is found due to the weather.

For example, if you want to go through the Kiel Canal in Germany, which could save you up to 460km on a route from the Baltic Sea to the North Sea (or vice versa), you need to know that there are bridges over it. As a result, you can only pass through the Kiel Canal if you have 40m or less vertical clearance. Therefore, if you are taller than 40m, you need to navigate around the canal. Your fit-for-purpose data will return the correct route, considering your ship's height. However, without fit-for-purpose data, you might not know this valuable information in advance — which could land you in serious trouble.

When you request a route using fit-for-purpose data, the software will provide a route that fits every requirement. For example, it will consider your cargo, ensuring you don't fall foul of any local restrictions. It factors in the dimensions and weight of your boat. And, of course, it considers the weather.

With fit-for-purpose data, you can rest assured that your route is the best available at that time, meaning you run your fuel consumption efficiently and maintain safety for your ship and crew.

Fit-for-purpose data accounts for the following restrictions:

- **Cargo** – on some local shipping routes, it's illegal to carry specific cargoes.
- **Vessel type** – some vessel classes are prohibited from some local shipping routes.
- **Overall length** – some local shipping routes operate vessel length restrictions.
- **Gross tonnage** – some shipping routes restrict the weight of the vessel, including cargo.
- **Maximum draft** – many routes will operate restrictions on the maximum draft of a ship due to changes in water depth.
- **Vertical clearance** – like the Kiel Canal, many routes will have maximum vessel height restrictions.
- **Beam size** – some routes restrict the beam sizes for ships traveling through.
- **Conditional areas** – some routes will enforce rules such as:
- **Speed limits**
- **Emission control**
- **Avoidance**
- **Latitudes** – some vessels will be restricted on how far north or south they are allowed to travel.
- **Weather** – captains can request routes to avoid bad weather.
- **Depth** – captains can also request routes with a minimum water depth to fit their vessel draft and required under-keel clearance.

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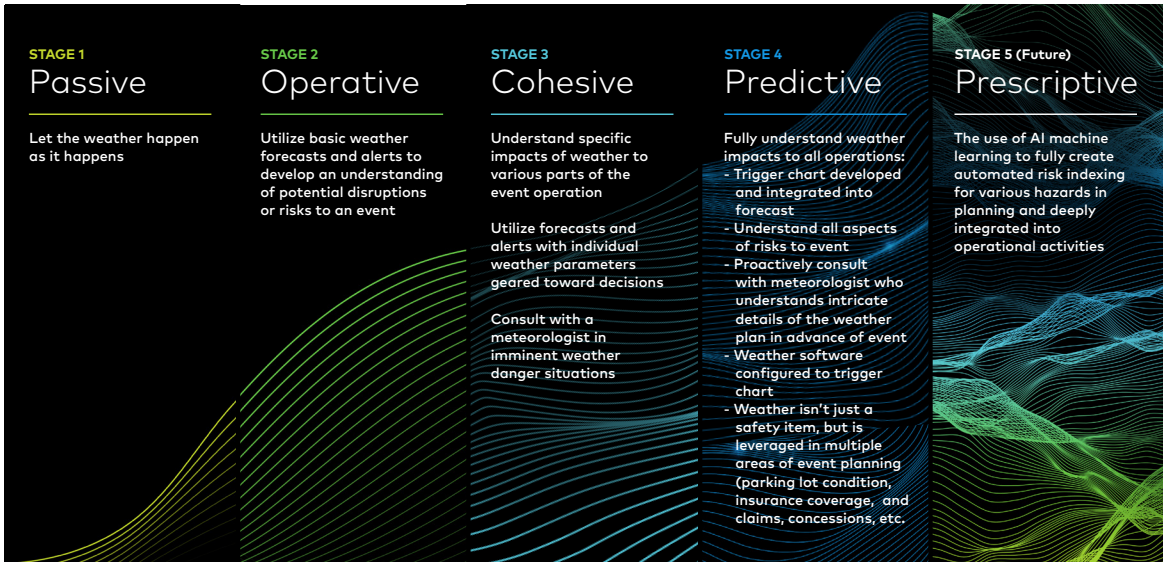
3. The DTN Weather Maturity Curve

While 91% of respondents to the DTN survey agree that weather data is necessary, ship owners and operators differ vastly in how they have adopted weather data. For example, one-third of respondents still need weather data feeding into their data platform, while only 10% have fully integrated weather data into their system.

We have classified how organizations adopt weather data in the DTN Weather Maturity Curve. It has five stages:

- **Passive** – no weather data in the decision-making process.
- **Operative** – current technology enables the company to check forecasts in immediate and contained circumstances, such as avoiding bad weather to keep the vessel and crew safe.
- **Cohesive** – integrated selection of weather data for a combination of use cases.
- **Predictive** – complete data integration for better operational decision-making.
- **Prescriptive** – AI-powered weather data for supply chain optimization and strategic decision-making.



Getting to the final prescriptive stage means you can reap the benefits of voyage optimization. However, currently, most respondents to the DTN survey only sit at stage 2 or 3. No one is at the final stage yet, but some organizations are close, as they use machine learning to support decision-making.

Moving through the stages is a journey of increasing challenges. Moving into stage 2 is simply implementing some readily available solutions for specific use cases.

But, going further requires more planning and cross-collaboration. For example, to get to stage 3, you'll need integration supported by your IT function. Stage 4 requires a change in company culture and organizational structure to incorporate data integration into existing processes.

Now, weather maturity is the preserve of larger, more mature companies. But, as technology improves, more organizations will be able to reap the benefits.

In summary

We have explored three of the main ways digitalization is driving voyage optimization. Achieving the goal involves:

- Streamlining your data collection and analysis systems
- Using weather data to plot your routes
- Supporting your voyage strategies with fit-for-purpose data

The interesting point is that this drive towards digitalization is happening against the background of the new CII regulation, due to come into effect on January 1, 2023. This regulation, which aims to make shipping more efficient and reduce carbon emissions, requires certain ship types to calculate their emissions and keep them within a specific range. For commercial ships, owners chartering out vessels on a long-term basis will need the parties taking out the charter to accept some limitations on their freedom to trade, or they may be in breach. This part of the regulation aims to decarbonize trade.

Fit-for-purpose data could be the key to those marginal gains that get your ships within the regulations, or it could be what keeps you efficient so you can gain an edge over your competitors. However you use it, fit-for-purpose data has much to offer as you look at the benefits of digitalization.

See for yourself how DTN data enhances safety, efficiency, and profitability. Request an expert consultation today.

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