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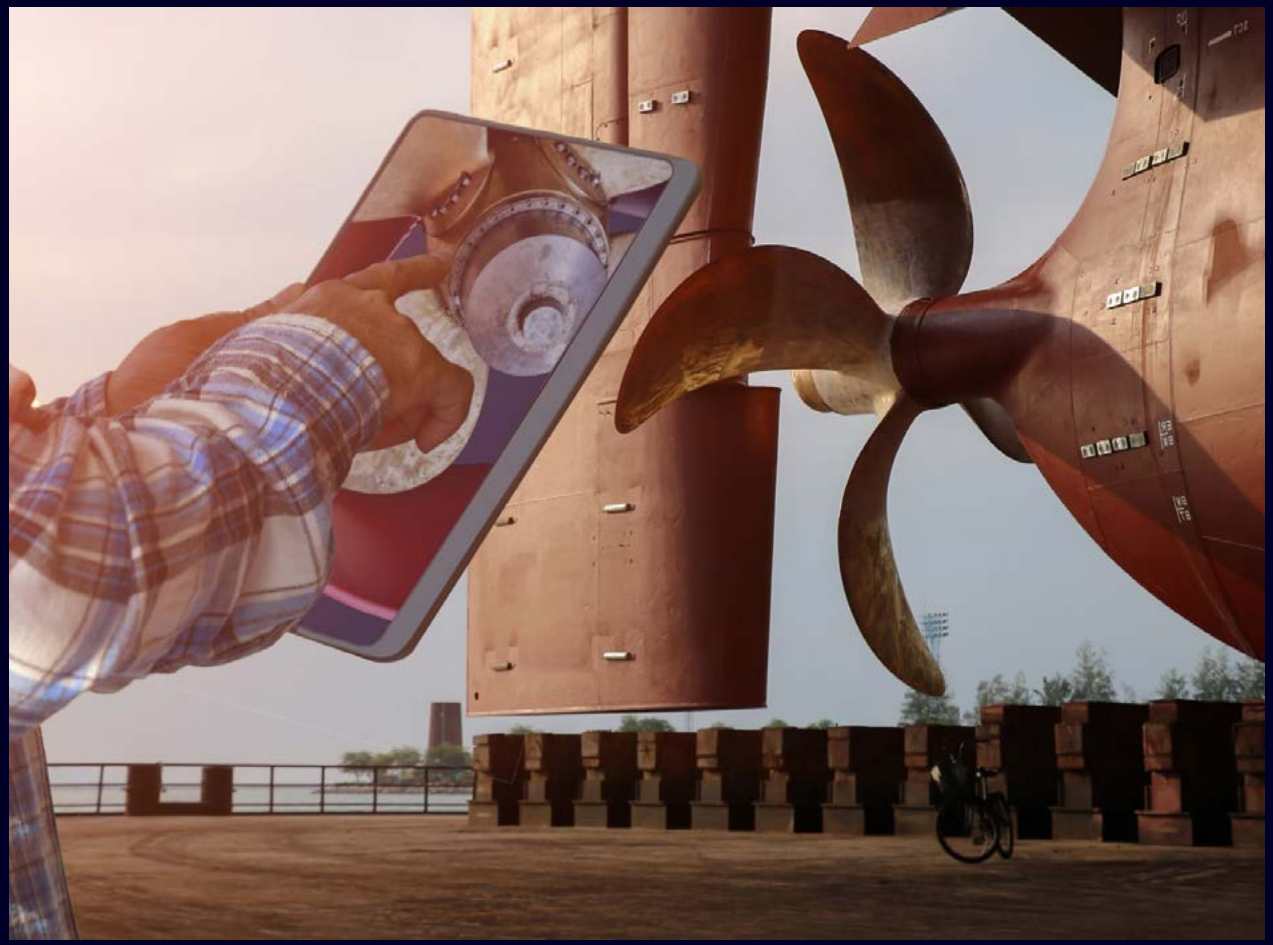
Four reasons the marine industry needs low-code development – and why it works

Addressing the needs of an evolving industry

The marine industry is undergoing rapid change that puts increasing pressure on design bureaus, manufacturers, and shippers alike. Competition has intensified, as has demand for high-tech, multi-role vessels. Concerns about the sustainability of manufacturing and shipping operations are increasing as well. There is also a growing need for connectivity – not only with supply chains, but also between ships, their home bases and port control authorities post-sale. These factors have led to an explosion of complexity.

To survive, industry players must respond by increasing operational efficiency, modernizing legacy systems, accelerating innovation, and improving experience for employees, customers and suppliers with digital ship construction, service and maintenance, and lifecycle management.

A low-code development platform designed for the unique challenges of the marine industry is an ideal approach to meet these demands, overcome challenges and gain the competitive upper hand.



Four key trends affecting the marine industry

These are the trends that the industry is facing – and the primary challenges with each trend.

Sustainability

The International Maritime Organization (IMO) has established stipulations to reduce the industry's greenhouse gases and CO_2 footprint. This affects ship design, manufacturing and operation.

Increased competition

Economic instability has increased competition, lowering demand, freight rates and profitability. Shipyards must build vessels that are smarter, lighter and more energy efficient – all while improving their own operational efficiency.

Interconnectivity

There is an increasing need for interconnectivity, whether that means connecting shipyards, design bureaus and suppliers along the supply chain or between operating vessels, their home bases and port control authorities.

Technology and versatility

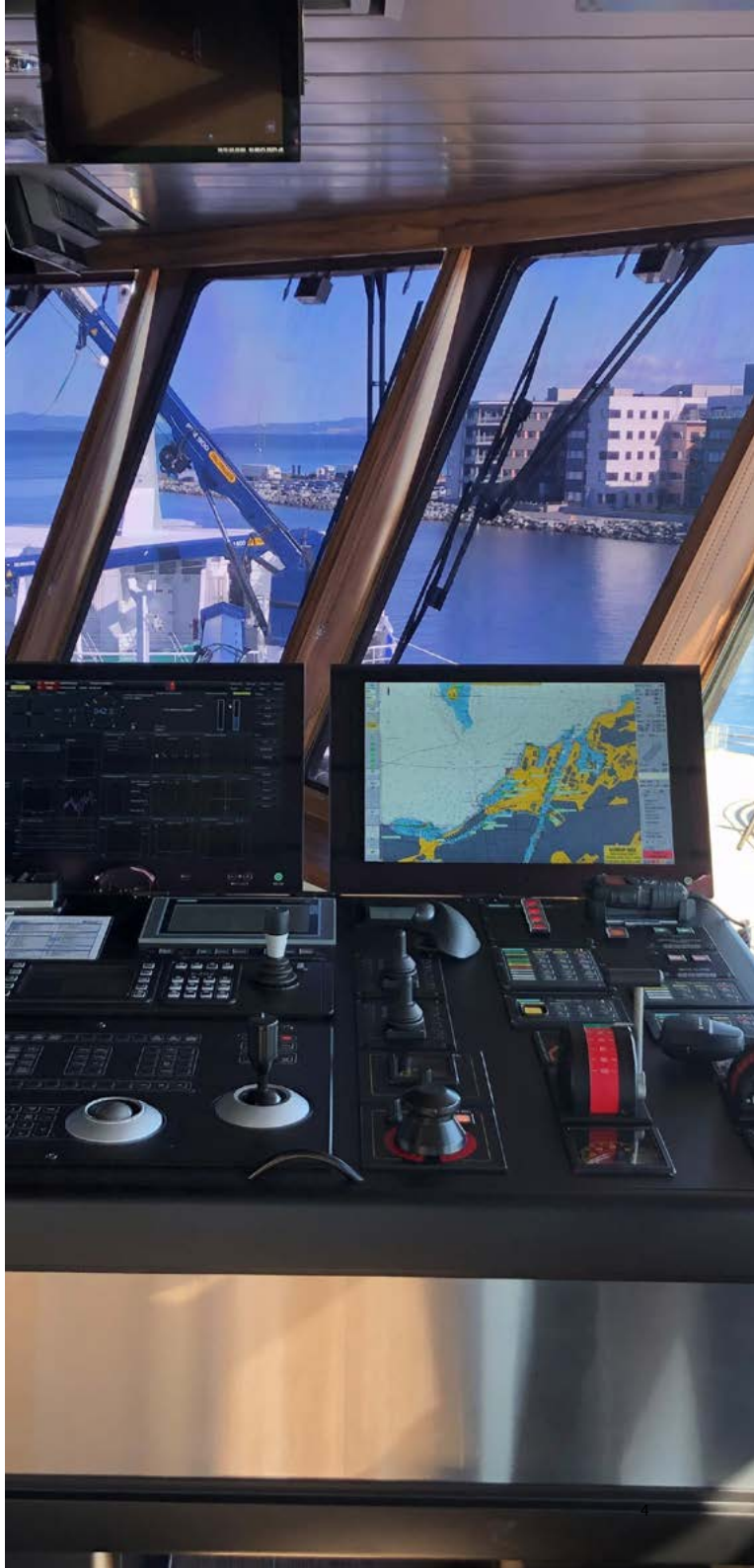
Alongside these trends is the increasing demand for high-tech, multi-role vessels, particularly in the defense sector as navies are tasked with a broad assortment of missions.

The result of these four trends is an explosion of complexity across the industry, from design to supply to construction and on through ownership and operation of ships at sea.

At every stage, organizations must develop and utilize new technologies that connect systems (both existing and new), people and organizations. They need applications to manage, store and exchange growing volumes and varieties of data to meet the demands of a growing number of stakeholders. Suppliers need applications that help them produce and deliver parts to shipyards in time to reduce inventory and prevent production delays. Bureaus and manufacturers need a way to sync design changes instantaneously. Ships need the technology to transmit volumes of performance data to anticipate repairs and maintenance and reduce downtime.

Building all these applications using traditional hand-coding methods is not only prohibitively expensive, but also too time-consuming to give marine organizations the agility they need to compete.

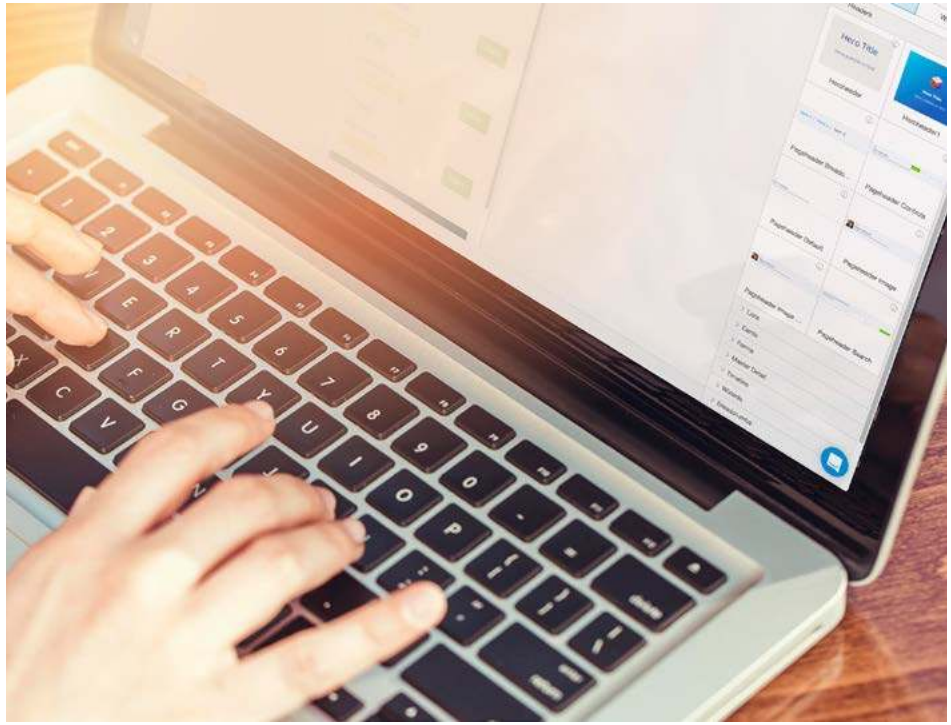
There is a solution, however: low-code application development, which we'll explore in the next section.



How low code can address complexity

Shipbuilding is unlike many other manufacturing processes: It is low volume and highly customized. For that reason, off-the-shelf IT solutions can only take it so far. It is also historically a conservative industry, replete with legacy technology, manual processes and fragmented, niche solutions. These create significant challenges as the industry begins to embrace digital ship construction, service and maintenance, and lifecycle management. Systems don't speak with one another. Development cycles are too lengthy, and there is a shortage of development talent. IT and business teams struggle to collaborate.

That's where low code comes in. **Low-code application development is a visual, model-driven way to build and deploy software applications** that employs a drag-and-drop interface with the ability to add more complex programming as needed. Business users and professional developers of all skill levels can build apps that bring new functionality and interconnectivity to existing or new systems so they can continue to provide value. A best-in-class low-code platform like Mendix can help shipbuilders **boost efficiency, modernize legacy systems, accelerate innovation and improve user experience.**



Four ways low-code development can address complexity and accelerate digital transformation in every facet of the marine industry

1 Improve operational efficiency

Streamlining ship production, maintenance and operation is an absolute requirement for an industry that witnesses the erosion of its profit margins. Low-code development can improve efficiency by getting the right information to the right people wherever and whenever they need it – with or without a network connection.

A low-code app can exchange data from any enterprise system. Everyone can work with the same data without manual data transfers that can introduce error and create governance issues.

For example, a yard worker may need to access information from the company's product lifecycle management (PLM) system. This might require a steep learning curve just to reach the relevant information. With a low-code development platform, you can create a holistic planning app that provides the yard worker with a targeted, role-based dashboard combining logistic information from the enterprise resource planning (ERP) system, diagrams from the PLM system and metrics from the manufacturing operations management (MOM) system in an easy-to-read visual format.

2 Modernize legacy systems

Organizations often depend on legacy enterprise software systems that lack capabilities and connectivity but still do their primary job well. Low-code development helps your organization modernize these legacy systems to ensure you remain agile enough to respond quickly and efficiently to market, regulatory and technology changes.

Because low code can connect with both legacy on-premises systems and cloud SaaS solutions, it can bridge the gap between these systems. You can connect siloed, disparate systems by layering a low-code app on top without having to upgrade the systems and without compromising them or the data they store, process and share.

For example, shipbuilders can close the loop in the Golden Triangle of ERP, PLM and MOM, integrating these enterprise applications to create a single source of truth, facilitate automation and accelerate business processes. Ship owners can create connections that add IoT capabilities to bring in data from ships and their systems for preemptive maintenance. Engineers can use low code to extend the simulation-driven design capabilities in CAD/CAM systems to other areas of the enterprise, all without disrupting core systems or making unwanted changes to existing processes.

3
Accelerate innovation

The only way to create competitive advantage, increase sustainability and meet the IMO regulations is to innovate. Low code can help organizations accelerate innovation to bring greater efficiency to their operations or new products to their customers.

For example, a low-code application could tie into a functioning ship's systems, providing information back to the shipyard itself for predictive maintenance or to detect anomalies, performance issues or defects that require operational adjustments. Inspection apps can send updates from the yard to the PLM system, which interfaces with the CAD system. When the requested design change is made, it's uploaded back into the PLM again so that the revised plans are immediately available to those who need them.

4
Improve experiences

The marine industry faces a huge shortage of skilled workers that will only get worse as experienced workers retire. Low-code development offers an opportunity to capture and share this knowledge in a user-friendly way. Because low-code applications can be easily tailored to specific users, they improve experience by streamlining the tasks they need to accomplish throughout their day.

Suppliers can create or receive scheduling updates immediately. Yard workers can check on procedures or plans without worrying about accessing the network. Inspectors can update their records and send reports instantly. Customers can get maintenance alerts, performance readings and more.

Two examples of low code in marine settings

	Inclining test inspections	Issue management
What it is	An inclining test determines a ship's stability, lightship weight and the coordinates of its center of gravity. It's applied to newly constructed ships, or those altered in ways that could affect stability.	Unexpected issues can occur at any time during ship construction. To minimize risk and disruption, workers perform periodic inspections so they can detect and report potential issues as they arise.
Why it's complex	Performing an interim inclining test during construction is a painstaking process that requires end-to-end inventories of the vessel in its current state. These inventories must include equipment or fittings yet to be installed, as well as construction equipment present that will be removed before the ship is complete.	Inspectors need wireless mobility to move freely in and around the ship and report issues as quickly and accurately as possible to the right person. The system should also support a workflow to follow up on issue resolution.
How low code can help	A low-code mobile application with a bidirectional connection to Teamcenter allows inspectors to indicate exactly what equipment is present on a 3D rendering. The app can work offline, so it doesn't require Wi-Fi network access to work.	A low-code issue management app can facilitate inspections inside and outside the vessel. The app would function in both online and offline mode on mobile devices, using a map of the ship and QR codes to automatically identify the location of a specific issue. Starting with a predefined questionnaire, an inspector can run down a checklist, as well as generate new issues. The system automatically reports any open issues to the relevant contractor. The low-code app can integrate with bespoke hardware (such as devices that measure paint thickness), as well as any PLM system to ensure smooth follow-up and issue resolution.

Watch this on-demand webinar to learn more about low-code applications in the marine industry.

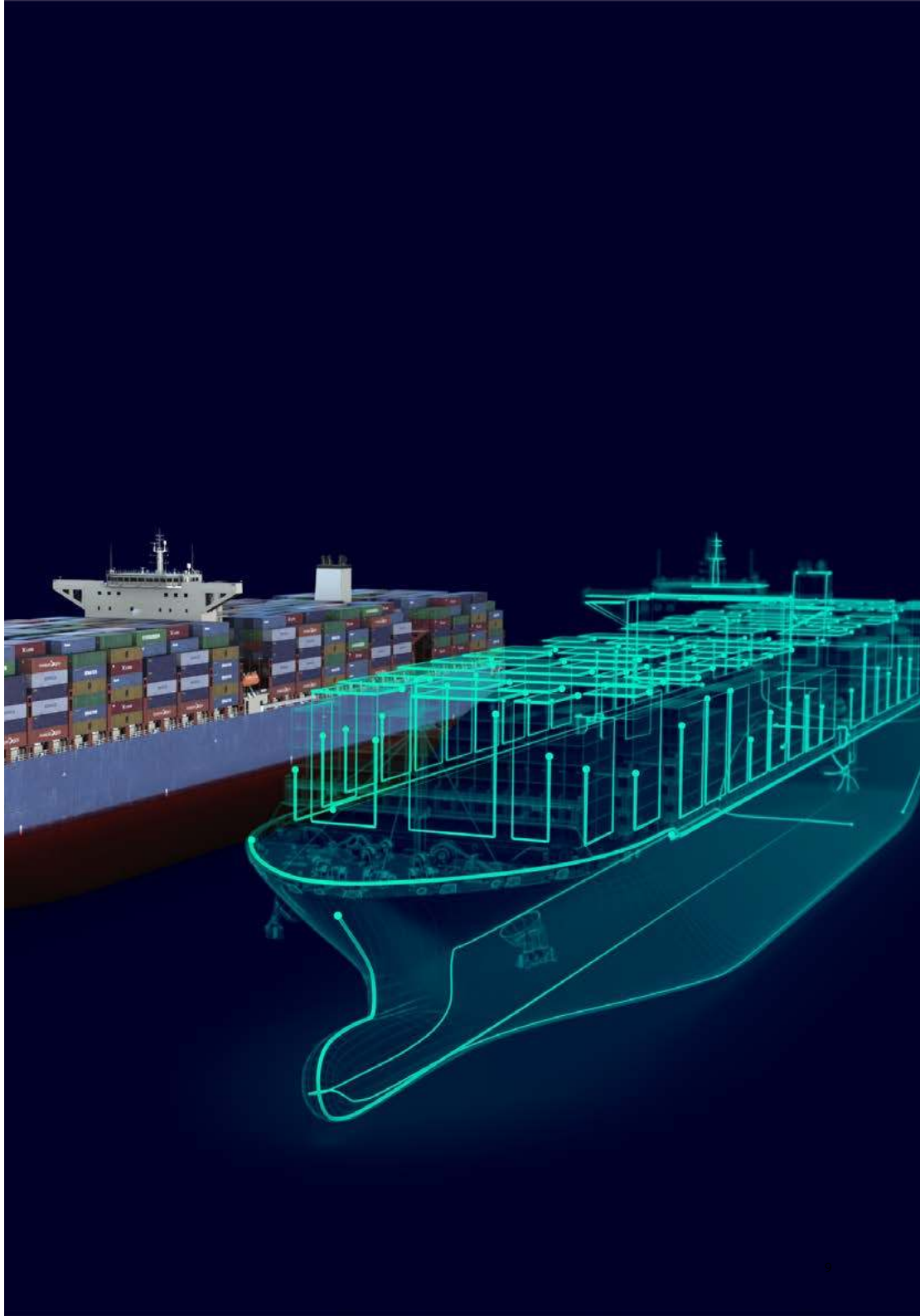
Creating a digital-first marine industry

The maritime industry is evolving. To meet today's regulations and market demands, ships need to be greener, safer, smarter, more cost-effective, more connected and more adaptable than ever before, while manufacturers, suppliers and ship operators have to be lean and agile to succeed. They must embrace cloud computing and "as-a-service" operating models to speed agility and reduce costs associated with building and maintaining on-premises infrastructure.

In the race to achieve digital transformation in digital ship construction, service and maintenance and lifecycle management, speed and simplicity is of the essence. Low-code development speeds digital transformation by improving operational efficiency, modernizing systems, accelerating innovation and improving user experience.

Learn more about the ways in which the Mendix low-code development platform can help your marine organization accelerate its digital transformation.

Start for free.



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