Maritime systems lack integration. Better communication and data sharing could break that barrier, which would greatly contribute to the effectiveness of how ships interface both with each other as well as ports, not to mention all the hinterland actors whose businesses depend to a considerable degree on when a vessel actually calls to a berth. The solution lies in providing the numerous supply chain shareholders with a common maritime digital infrastructure, a platform on which everybody speaks the same language and has the same situation overview.

Such a solution would enable the parties, including system suppliers, service providers, and authorities to achieve interoperability by making it possible to easily exchange ships voyage plans, timestamps (e.g., estimated times of arrival to ports), navigational warnings, and any other standardized information that might come in handy.

Surprising as it may sound at first, this digital platform would give the maritime shareholders an identity. Just ask yourself a question in this context: would human-to-human communication on a global scale be even possible without unique telephone numbers or e-mail addresses?

Putting the backbone

Over the last ten years, several EU-backed projects have been developing a global common maritime digital infrastructure, EfficienSea2, STM Validation, ACCSEAS, and MONALISA to name a few. They’ve based their works around the Maritime Connectivity Platform (MCP) and its two critical components.

First, common identities are handled by the Maritime Identity Registry, think of it as an equivalent of a central person or business registry, which provides tokens for human interaction and certificates for machine-to-machine exchange. The Maritime Service Registry is the second key ingredient. It’s like a sophisticated yellow pages phone book that includes all services and gives guidance on how to specify and register services as well as supports the discovery of services.

What’s of no less importance, the MCP is an open source, vendor-neutral technology with which common Internet standards can make their way into the maritime navigation and transportation systems. In a nutshell, MCP functions as the backbone on which infrastructure for efficient, secure, reliable, and seamless electronic information exchange, using available communication systems, can rest.

In February 2019, the Maritime Connectivity Platform Consortium (MCC) was established by maritime administrations and research institutes from all over the world, among them OFFIS (Germany), KRISO (South Korea), RISE (Sweden), and the General Lighthouse Authorities of UK and Ireland (at the same time, the Danish Maritime Authority, the Swedish Maritime Administration, and South Korea’s Ministry of Ocean and Fisheries have joined the MCC as Governmental Observers). The MCC is going to be a governing body, acting as the coordinator for the provision of guidelines and standards for MCP.

Automation + standardization = interoperability

In order to benefit from the infrastructure, we need automated processes and communication. To make automation work, however, we also need new standards both when data formats are concerned themselves as well as for data exchange.

Data standards for, first, voyage plans and, second, port timestamps, have been developed as part of the Sea Traffic Management (STM) concept. The former is a global standard since 2015, while international committees are putting the latter to the test. What’s more, by looking into other existing and developing data standards, the people behind the STM can bring to the
The benefits of a Common Maritime Digital Infrastructure

In regards to the first, the ports of Rauma and Gävle will implement STM solutions for improving the synchronization between ships arrivals and port operations as well as improving the ports’ internal efficiency. Ferry and other traffic in the archipelagos between Finland and Sweden will use STM services to optimize the traffic flow near the many narrow passages.

The second project will see major ferry lines sharing with hinterland actors real-time estimated arrival and departure times. This will help logistics companies improve their planning and has the potential to make passengers more satisfied with their journey.

Last but not least, BaltSafe targets further increase the safety of tankers in the Baltic Sea, providing the carriers and crossing traffic with a common situational picture, with the possibility of advising on speed adjustment or course changes to avoid risky situations.

Apart from these, there are other projects across Europe and around the world that are picking up the STM and MCP standardization ball and running with it. In Singapore, for instance, the traffic control function will use the ships’ real-time voyage plans for planning, whereas the Port of Rotterdam is already compatible with the STM data formats.

Standards, agreements, and common digital assets are now in place to support interoperability between independent commercial and public IT systems. But evolution never stops: emerging standards and technologies have to be constantly evaluated and considered for implementation in order for the STM solutions to stay relevant.

Benefits in practice

To this date, STM Validation Project succeeded in creating a data-mining network of 250+ merchant vessels employed in regular traffic as well as six VTS centres, nine ports, and 13 simulation centres across the whole of Europe. They all rely on a common maritime digital infrastructure, backed by many of the dominating system suppliers for VTS and on-board systems, such as Wärtsilä and Transas, Furuno, Kongsberg Norcontrol, Airbus, SAAB, and Adveto.

As a result of the efforts, the STM Validation Project reports, VTS operators’ ability to predict challenging traffic situations has increased because ships can share their voyage plans with the VTS centre via a common maritime digital infrastructure. Next, among seafarers, 73% of them feel safer when they use enhanced monitoring services from shore, based on the digitalised sharing of their voyage plans. A large majority of port actors such as agents, port control, and terminal operators also sees a potential for better decision-making with digitalised and standardized information sharing.

That said, during the works a few question marks have been uncovered, too, identifying new study fields. For instance, is there a risk of over-reliance on the digitalised information?; could operators on-board and onshore be exposed to information overload?; when will system suppliers have matured their user interfaces, so they support the use of multiple digitalised services in a smart way?; will international regulations need to be updated as STM continues to redefine the playing rules?; and in what way seafarer training will change?

Evolution never stops

Basing on these findings, a number of other digital-heavy implementation projects are working towards bringing more operational solutions to the market. The Baltic Sea region is leading the way, including the EfficientFlow, RealTimeFerries, and BaltSafe initiatives.

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