

Possibilities and barriers for developing a new common database concept and structure

How can we create a roadmap for e-maritime and the increased automated flow of information related to port calls?



Recommendation from the High Level User Group

Final report 11th of November 2016

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1. Introduction

This report summarises the results from the second High Level User Group (HLUG) of the EfficienSea 2 project, which was held in Copenhagen the 1st of June 2016 at the offices of the Danish Maritime Authority. The input was given through joint discussions between the members of the HLUG. The objective of the meeting was to identify possibilities and barriers for implementing e-maritime and increasing the automated flow of information related to port calls among maritime stakeholders. The discussions were based on the five scenarios for automated data exchange that BIMCO has developed as part of the EfficienSea 2 project.

New ICT solutions are rapidly improving the possibilities for increasing the efficiency of the shipping industry. The overall objective of the EfficienSea 2 project is to co-create and deploy innovative solutions for more efficient and safer waterborne operations. The project consists of a carefully selected consortium, encompassing excellent technical and human factor competences, equipment, system- and service providers as well as authorities and international organisations, with expert domain and regulatory knowledge and influence. For more information on the EfficienSea 2 project please see <http://efficiensea2.org>

One of the elements in the EfficienSea 2 project is to focus on improving the exchange of information between maritime stakeholders by facilitating the automatic flow of information within and between ships, ports and their surroundings. This aim is to standardise templates and reporting forms together with techniques for single reporting in order to streamline the information flow to ensure efficient exchange of data. This will reduce the time spent preparing and executing the data exchange and thereby reduce the administrative burden on the shipping industry.

In order to help reducing the administrative burden related to port calls, BIMCO has developed five possible scenarios on how to automate the exchange of information between the maritime stakeholders as part of the EfficienSea 2 project.

The five scenarios are:

- Scenario 1: Exchange of information between ship and port
- Scenario 2: Port information for fine-tuning the voyage plan
- Scenario 3: Seafarers' licences and STCW documents
- Scenario 4: Coordinating the port call
- Scenario 5: Emissions information shared with authorities, ports and potential third parties

You can find the five scenarios described on the EfficienSea 2 report – Deliverable 5.2. – “Development of a new port database concept and structure”.

In order to support the work in the EfficienSea2 project and maximize impact a High Level User Group (HLUG) has been appointed. The HLUG consists of stakeholders from the maritime industry such as ship owners, business associations, ports, service providers, authorities, maritime organisations and developers of maritime equipment, which give advice on user needs and expert input on the possibilities and barriers for developing new ICT solutions for the maritime industry.

In order to help the project proceeding with the work on reducing the administrative burden related to port calls by automated exchange of information between maritime stakeholders a High Level User

Group meeting was arranged. The aim of the meeting was to help help developing a roadmap and identify key barriers and possibilities for the future work.

2. Participants at the High Level User Group meeting

Company	Name	Title
BIMCO	Aron Frank Sørensen	Chief Marine Technical Officer
DNV-GL Maritime	Flemming Mose Christensen	Area Manager, Denmark, Faroe Islands, Iceland & Greenland
Envecon	Rajesh Nair	CEO
Ericsson	Dogulas Watson	Director - Business Unit – Shipping
GS1 Denmark	Sacha Mendes da Silva	Head of Market Relations
IALA	Marie-Helene Grillet	Technical Operations Manager
IBM	Boy Steiner	Sales Director
ICS/Danish Shipowners' Association	Per Winther Christensen	Deputy Technical Director
Lloyd's Register, Copenhagen	Kim Wiese	Marine Business Development Manager for DK
Maersk Maritime Technology	Niels Bjørn L. Mortensen	Director, Regulatroy Affaris
Swedish Maritime Authority	Ulf Siwe	STM Validation Communications Officer
Weilbach	Torben Frerks	CEO
Project Partners		
BIMCO	Jeppe Skovbakke Juhl	Senior Marine Technical Officer
DMA	Bjørn Borbye Pedersen	Business Developer and Special Advisor
DMA	Tomas Groth Christensen	Softwaredeveloper
MDCE	Jan Boyesen	Head of Development

3. Meeting agenda

The agenda for the HLOG meeting was the following

1. Welcome and short round table, by Jan Boyesen
2. Introduction to the EfficienSea 2 project and the Maritime Cloud, by Bjørn Borbye Pedersen
3. Presentation of the 5 scenarios, by Jeppe Skovbakke Juhl
4. SWOT results on the 5 scenarios, by Jan Boyesen
5. Joint discussion and input the SWOT
6. Presentation of the selected scenario, by Jeppe Skovbakke Juhl
7. Joint discussion:

How do we create a sustainable business model?

1. *What are the expected costs and benefits and who will gain and pay these?*
2. *Who should pay, own, operate and control the system?*

3. *Who are the central partners to be involved when developing a system related to the selected scenarios 4, 1 and 2?*

8. Wrap up and future steps, by Bjørn, Jeppe and Jan

4. First HLUG session – SWOT of the 5 scenarios

During the first session of the HLUG meeting each of the five scenarios was presented and the strengths, weaknesses, opportunities and threats were discussed. The strengths and weaknesses of the SWOT are the beneficial and negative factors that are internal to the project. The opportunities and threats of the SWOT are the beneficial and negative factors that are external to the project.

Some of the overall comments on all the 5 scenarios are that even though they are different, they are also interrelated and often require the same standards and solutions. If you solve some of the central issues (such as digital signatures) these can be used in all scenarios. Furthermore, the solutions should build on the EPCglobal, ISO, S100 or other industry standards in order to maximize impact. At the same time, it is very important to design a system that has a high level of cyber security since the data exchange often concerns sensitive information.

Scenario 1: Exchange of information between ship and port

Scenario 1 focuses on reducing the administrative tasks related to preparing pre-arrival and port call documents. The scenario was perceived as very important by the HLUG. Among the strengths are that it is closely related to the core work carried out by BIMCO in the EfficienSea 2 project. Furthermore, the vast extent of the administrative burden is well documented. Weaknesses include, that the scenario assumes that electronic and electronically signed documents will be acceptable by the authorities outside of the port such as customs. Furthermore, it weakens that the scenario does not address the fundamental challenge of implementing e.g. National Single Windows which are policy related rather than technical. Among the opportunities are that the scenario has the potential to change information exchange in the future and lower the administrative burden on ships as well as ports. The threats are that unless the system is strictly managed the many stakeholders and users will be a challenge. Furthermore, the solution may be too advanced to many ships and ports to test.

Input from the discussion

In order to make this scenario possible there will probably need to be a long transition period where authorities use an electronic document format before a fully automated system will be in place. The idea of standardizing reporting and letting the authorities build their own template based on such a standard, as well as letting authorities that pull the information was well received by the HLUG. However, it might be a challenge that authorities have to pull the information actively rather than receiving it from the ships (ship-owners or agents). A way to motivate authorities (and ship agents) to adopt the system could be to focus on that they can save human resources through less routine tasks. However, there is a risk that the burden is shifted to another stakeholders rather than being removed. If the information is standardized, there is better chance that the authorities will create a template based on the standard since there will be less work related to updating reporting templates in the future.

Scenario 2: Port information for fine-tuning the voyage plan

Scenario 2 addresses the potential for automated gathering of information collected by the ship prior to

arrival at port as part of the voyage planning. Among the strengths of this scenario are that it provides a way of confirming that the preliminaries for arrival are complete. Weakness include that this might be seen as an extra administrative burden from the ship side, that the scope is very limited, that the information must come from a trusted source in order to be used for navigational purposes and that there is risk that the scenario will address the same work which has already been done in the AVANTI project. The scenario gives the opportunity to improve safety of navigation as it reduces workload on the bridge while some of the weaknesses are that there is a risk of over engineering a trivial matter and that the responsibility “issue” may hinder voluntary participation of a realistic testing.

Input from the discussion

Scenario 2 is closely related to the Avanti, Pronto and STM Validation projects at it is important to seek collaboration between EfficienSea 2 and these projects so work is not duplicated. It is also important to take into account that many stakeholders are involved in updating the information and keeping the data valid. It will be a comprehensive and complex task to include all these data sources into the solution.

Scenario 3: Seafarers' licences and STCW documents

The third scenario addresses the potential for digitalizing the seafarer documents in order to reduce the administrative burden on ship operators when keeping track of the personal certificates and seafarer documents. The strength of this scenario is that it supports electronic documents and certificates. However, only few of the STCW certificates are standardized and the international interest might be very small. Even though it might create an opportunity to enhance the availability of information on seafarer qualifications, it is a threat, that it might create new administrative burdens. Furthermore, the system needs to be recognized by an internationally body and this might be a barrier.

Input from the discussion

The IMO/ILO has previously worked on e-certificates for seafarers, however with little success. Furthermore, the Estonian Maritime Administration is working on a project on electronic seafarer certificates, and it is worth looking more into this project before initiating own project activities. Even though the suggest system would include a lot of sensitive data such as medical information, it was assessed that this can be handled. The project should look at other industries such as the health sector in order to get inspiration on how to handle sensitive data.

Scenario 4: Coordinating the port call

Scenario 4 concerns the information that has to be checked by charters in their preparation before they commit themselves by signing a contract. Among the strengths of this scenario are that it covers many different stakeholders and builds on knowledge from previous EU projects. However, the scope is limited to charter information and there is risk that the scenario will duplicate work done in other projects such as the Avanti project. Among the possibilities are that the solution has the potential to make the industry more efficient while the risks includes that the scenario assumes that a standard template will be universally accepted which might be problematic since it is dependent on third party participation and acceptance.

Input from the discussion

Scenario 4 is similar to scenario nr. 2 but has more commercial information where the shipping agent collects and distributes information to the port etc. The scenario has the potential to disrupt the current market and become a challenge for the agents. However, the first movers in this arena might be able to gain competitive edge and new business opportunities. At the same time some agents will be happy to get rid of some of the administrative tasks. The concept is close related to the Port Collaborative

Decision Making activity in the Sea Traffic Management Validation Project as well as the Pronto project. Close collaboration with these activities is therefore needed.

Scenario 5: Emissions information shared with authorities, ports and potential third parties

Scenario number five focuses on using automated reporting in order to enforce the regulation on sulfur in the fuel of ships and air emissions. Several of the High Level User Group members pointed out that scenario number five is of great importance to the industry. The reason for this is that reductions of sulfur emission in order to comply with requirements under annex VI in the MARPOL convention in the designated Emission Control Areas comes with high costs for the ship owners. The economic incitement for not complying with the regulation is therefore high and there is risk that some ship-owners deliberately will disobey the rules in order reduce costs. The incitement for non-compliance will even increase when the global cap on sulfur of marine fuel is implemented since the amount of ships and the areas included will be greatly increased. In order to help the ship-owners to document compliance with the sulfur regulation the scenario suggests a voluntary system of information exchange.

Input from the discussion

This work is very important for the shipping industry and it has therefore been decided that further work on ECA compliance monitoring is needed. This will be done in another work package of the EfficienSea 2 project since the solution apart from data exchange also will focus on measuring emissions and how to create the data. The HLUG is positive towards a paradigm shift where ships-owners actively send emissions data to prove that they are in compliance. The port state control often does not have the resources to monitor emissions and it is therefore a good idea to use a setup as in other industries (e.g. the road freight industry where data is recorded continuously from trucks). However, there are still many challenges in order to implement the scenario as e.g. the equipment for emissions monitoring is still expensive and unreliable.

5. Second HLUG session – selection and discussion of preferred scenarios

The second session of the HLUG meeting was focused on selecting the preferred scenarios, and to identify important possibilities and barriers to be taken into consideration when creating a roadmap for the future work of the scenarios. During the beginning of the second session it was decided that the focus should be on scenarios 1, 2 and 4. Scenario number 5 is very important and will be worked on in another work package of the EfficienSea 2 project, while scenario number 3 is very different than the others and there is already a project which is addressing this area.

Partners and collaboration with other initiatives

One of the central questions is how to involve external stakeholders into the development work and how to build cross industry collaboration. The shipping industry is very fragmented and it is important to include central players in order to maximize impact. The central players to include in the work are ship-owners, agents and the large ports as well as their representing organizations. ICT firms and service providers should be involved as advisors in order to secure the standards and systems developed work

well together with other existing systems. The authorities should also be involved as external stakeholders since it is them that often will be pulling the data out of the system and they are the end users in many cases. However, the authorities should not be leading the work. Focus should rather be on creating a industry standard.

Furthermore, it is very important to have a close collaboration with other existing initiatives such as the STM Validation, Pronto and Avanti projects in order to create synergies and involve more users rather than creating a situation of competition.

IMO was not perceived as the right forum for developing the system since it includes commercial information. The system should build on existing standards such as ISO or EPCglobal. Another possibility is to create a sub-standard of the S100. In any case the project needs to prepare at good concept if such international organ should adopt it. Furthermore, it shall be noted that the development and adoption of such standards often takes many years. If business interests are the drivers of the development the time for implementing the standard will probably be shortened.

It was mentioned that the IHMA - International Harbour Masters Association has written a paper with definitions that have been passed to the IMO and which will be adopted by the IMO within two years. The paper was passed fast since it only includes definitions and not regulation. If a similar team of players makes a suggestion for a data definition format it might however get through the IMO quickly and this could be a way forward.

Creating a roadmap

One approach could be to start by implementing the system in some of the major and advanced ports and ship-owners and letting the system spread like “rings in the water” to other ports and regions.

Event thought it was decided during the HLOG meeting to combine scenarios 1, 2 and 4 into the future work, the HLOG agreed that as the task becomes bigger and more complex it will also be more difficult to get results out of the work. The project should therefore consider making the task smaller and create a template that can be expanded with more information later on in order to gain speed. The preferred and most critical information should be selected and included. In general the HLOG perceived Scenario 1 as the most relevant scenario for the future work.

At the same time it was suggested to look at if some of the information could be provided from the land side instead of the ship side in order to reduce the captain’s workload. A lot of the information comes from the ship-owners office originally and it does therefore not make sense that it is the ship that has to provide this information to the stakeholder on-shore.

A lot of the data does not change between port calls and it was also suggested to design the system in such a way that only new data is uploaded into the system in order to eliminate duplication of work.

Inside Europe there are many different reporting templates. Event thought the scope of the system is to have a global system, the National Single Windows could provide at good platform to develop the concept. This could be used as a building block for a global solution later on.

Another important issue to solve is how to digitalize stamps and signatures as a way to reduce the administrative burden. There are systems such as DNV Navigator which supports port clearance and

compliance documentation. However, even though such systems prepare the documents, they still need to be printed and signed and handed over in several copies to the authorities.

Business models

There are two clear paths to for the development of automated data exchange which build on two different possible business models. One is to define a standard for the data to be exchanged and let the companies and authorities to integrate the standard into their existing templates, services etc. if they find that these standards can help reducing the administrative burden. Another approach is to set up an actual service with a database and try to commercialize this. The second option is much harder to implement since it will require allocating many more resources into the development activities.

Some of the HLUG participants find that the role of the commercial players is not entirely clear. If commercial players should be part of this solution it is necessary that their customers are interested in the solution. Otherwise the service providers will most likely not be interested in spending resources on the development activities.

Furthermore, it is important to clarify the connection between the automated data exchange system and the Maritime Cloud being developed as part of the EfficienSea 2 project. From a commercial point of view there needs to be some more information on how the Maritime Cloud works. It is in this context important to define the business model for the Maritime Cloud itself and the relationship to the selected scenario.

One of the new business possibilities emerging from automated data exchange that the project could look into is the possibility to sell the data collected by the ships. The more data you have for producing e.g. navigational chart the higher the value for the industry.

Conclusions and recommendations for future work

The High Level User Group found that the two most relevant scenarios to proceed with are:

Scenario 1 - Exchange of information between ship and port

Scenario 5 - Emissions information shared with authorities, ports and potential third parties.

As there is work being carried out on Scenario 5 elsewhere in the EfficienSea 2 project (Work Package 5, task 3), it was decided that Scenario 1 and an attempt to increase automated reporting to authorities was the most relevant task for future work.

There are two clear paths to for the development of automated data exchange which build on two different possible business models. One is to define a standard for the data to be exchanged and let the companies and authorities to integrate the standard into their existing templates, services etc. Another approach is to set up an actual service with a database and try to commercialize this. The second option is much harder to implement since it will require allocating many more resources into the development activities.

One approach could be to start by implementing the system as a pilot in some of the major and advanced ports and letting the system spread like “rings in the water” to other ports and regions. It is

important to start such a pilot with a consortium consisting of central players including ship-owners, agents and the large ports as well as their representing organizations. ICT firms, service providers and authorities should be involved as advisors but not leading the work. It is furthermore very important to have a close collaboration with other existing initiatives such as the STM Validation, Pronto and Avanti projects in order to create synergies instead of completion.

The project should consider making the task relatively narrow and create a template that can be expanded with more information later on in order to gain speed. The preferred and most critical information should be selected and included. Even though the scope of the system is to have a global system, the National Single Windows could provide a good platform to develop the concept. This could be used as a building block for a global solution later on. Furthermore, the best way forward would be to build on existing industry standards such as EPCglobal or ISO in order to maximise impact and secure fast development.

Some of the HLUG participants find that the role of the commercial players is not entirely clear. If commercial players should be part of this solution it is necessary that their customers are interested in the solution. It is furthermore important to clarify the connection between the automated data exchange system and the Maritime Cloud being developed as part of the EfficienSea 2 project. The participants would like to get more information on how the Maritime Cloud works and how the business model for the Maritime Cloud will be.

It was suggested to look at if some of the information could be provided from the land side instead of the ship side and to build the system in such a way that only new data is uploaded into the system and the rest is reused.

Another important issue to solve is how to digitalize stamps and signatures as a way to reduce the administrative burden.

Appendix 1 – SWOT table on the 5 scenarios

<p><i>Strengths</i></p> <p>Scenario 1</p> <ul style="list-style-type: none"> • Focused on reducing the Administrative burden and its consequences for safety • Is the core of the work BIMCO is carrying out in E2 • A lot of expertise in the E2 project concerning the S1. <p>Scenario 2</p> <ul style="list-style-type: none"> • Provides a way of confirming, that the preliminaries for arrival/departure are complete. <p>Scenario 3</p> <ul style="list-style-type: none"> • Supports the use and acceptance of electronic documents and certificates. • DMA has expertise on STCW certificates <p>Scenario 4</p> <ul style="list-style-type: none"> • Enhancing the efficiency of a port call through better situational awareness. • Covers data transfer between many stakeholders • Builds on knowledge attained in other EU projects <p>Scenario 5</p> <ul style="list-style-type: none"> • There is keen interest in measuring from more external stakeholders in the industry. • (The scenario has not been correctly defined) 	<p><i>Weaknesses</i></p> <p>Scenario 1</p> <ul style="list-style-type: none"> • Assumes that electronic and electronically signed documents will be acceptable to authorities outside the port, eg: customs. • Unless this is strictly managed the many stakeholders may be a problem. • Does not address fundamental challenges of implementations of NSW which are policy rather than technical issues. <p>Scenario 2</p> <ul style="list-style-type: none"> • From the ships side this may be seen as an extra administrative burden. • The scope is very limited and this may be a hindrance for this scenario. • Navigational information/services must come from an official source for it to be used for navigation. • Additional complexity and the possibility for conflicts in information correctness and validity. • May re-invent work already done on systems such as AVANTI which works very well outside a cloud solution. <p>Scenario 3</p> <ul style="list-style-type: none"> • Attempts to solve a problem which does not exist. • Only a few of the STCW certificates are standardized and the SC may therefore be of limited interest seen from an international angle. <p>Scenario 4</p> <ul style="list-style-type: none"> • Scope limited to charterer related information. The proposed solution does focus on port call coordination but on information for contract fixing. • May re-invent work already done on systems such as AVANTI which works very well outside a cloud solution. • The commercial interests in this will have to be taken into consideration to avoid unbalanced commercial impact. <p>Scenario 5</p> <ul style="list-style-type: none"> • Not correctly defined. Demonstration of compliance is not through measurement and reporting of emissions. Compliance is demonstrated through use of compliant fuel (bunker delivery note). • Does not address relevant information exchanges: <ul style="list-style-type: none"> ○ Fuel oil non-availability reporting; and ○ Reporting instances of the provision of non-compliant fuel. <p>Could be seen as pointing fingers - Big brother is watching you.</p>
<p><i>Opportunities</i></p> <p>Scenario 1</p> <ul style="list-style-type: none"> • Potential to change information exchange in the future! • It will lower the administrative burden to ships and ports. <p>Scenario 2</p> <ul style="list-style-type: none"> • May improve the safety of navigation. <p>Scenario 3</p> <ul style="list-style-type: none"> • Potential opportunity to enhance the availability of 	<p><i>Threats</i></p> <p>Scenario 1</p> <ul style="list-style-type: none"> • Policy decisions and implementation of NSW, not technical solutions, are the source of Administrative burdens. • The solution may be too advanced for many ships to test. Some of this information is sensitive and may be threatened by hackers etc. <p>Scenario 2</p>

<p>information seafarer qualifications.</p> <ul style="list-style-type: none"> Electronic certificates will be beneficial to shipping, and the use of them has been very limited until now. <p>Scenario 4</p> <ul style="list-style-type: none"> Enhancing the efficiency of a port call through better situational awareness. Improvement of port calls through coordination may have a large potential to make the industry more efficient <p>Scenario 5</p> <ul style="list-style-type: none"> If scenario correctly defined, this could make the process for Fuel oil non-availability and the provision of non-compliant fuel reporting more efficient. Emission information may help to create a level playing field by ensuring compliance to MARPOL emission regulation 	<ul style="list-style-type: none"> Potentially an over-engineered solution to a trivial matter. The responsibility question may hinder voluntary participation of a realistic testing. <p>Scenario 3</p> <ul style="list-style-type: none"> Opening up seafarer records to service providers – reducing one administrative burden but increasing their exposure to “SPAM” from related service providers. IMO’s FAL committee is still discussing electronic certificates and this could potentially change the format. All this information is sensitive and may be threatened by hackers etc. Would need to be supported by an internationally recognized application. <p>Scenario 4</p> <ul style="list-style-type: none"> Digital collaboration on information sharing does not equate to collaboration in the provision of physical services. Assumes that the standardized template will be universally accepted. Is dependent on third party participation, which may be problematic if it is seen as a threat to future business. <p>Scenario 5</p> <ul style="list-style-type: none"> Incorrectly defined scenario for reporting which does not reflect the actual and/or anticipated requirements for emissions reporting.
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