

4.2.3 An EI/EC Pilot in a Marine Shipping Network (UCY)

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Abstract

The COIN platform allows exposure, combination and integration of interoperability and collaborative services for their application to specific business domains. The objective is the exploitation of the COIN platform's technological capabilities and services to the Cyprus maritime shipping sector; together with our industrial partner Donnelly Tanker Management. In particular, two highly suitable business use cases have been identified on the basis of which the pilots have been developed using the COIN platform and the provided COIN services. The development of the pilots demonstrated how the COIN platform and its offered services can aid in simplifying and expediting the processes of the maritime shipping domain. On the basis of the pilots initial results are presented in this chapter.

Keywords: Enterprise Interoperability, Enterprise Collaboration, Civil Engineering Domain.

4.2.3.1 Introduction to Cyprus Shipping Sector and Business Use Cases

The contribution of the shipping industry to the Cyprus economy is as high as 5.5% of the Gross Domestic Product (GDP) –ship management and ship owning combined–, a value higher than in most other European countries [6]. The Cyprus Registry is classified as the 10th largest merchant fleet globally and third in the European Union, with approximately one thousand shipping vessels; gross tonnage in excess of 19 million [6]. Limassol is considered to be the largest third party ship-management centre in the EU and one of the largest in the world (in excess of 130 ship-owning, management and other shipping related companies maintain offices there). The European merchant fleet capacity was significantly increased upon Cyprus accession to the EU, with the island contributing 15% – 25% of the EU fleet [8]. Among the ship-owning/management companies established and operating in Cyprus, it is estimated that 87% are controlled by EU (including Cypriot) interests. Approximately 4.500 persons are employed ashore and 40.000 seafarers of different nationalities are employed onboard vessels controlled and/or managed from Cyprus [6].

The distributed nature of partners involved in the marine shipping domain and the complexity of managing such processes calls for technological developments that will simplify these processes and reduce the time required to carry out this processes. For this reason, two business use cases have been identified and the developments necessary for building the pilots using the COIN platform and services were performed. The first use case describes the actions undertaken by DTM and other parties (e.g. charterers) to complete the voyage pre-fixtiture. Initially pre-fixtiture queries, a prerequisite for the voyage fixtiture establishment and completion, are issued and subsequently standard documents (i.e. standard charter party forms) are formulated after negotiations between United Product Tankers (UPT) and charterers. The outcome of these negotiations is a “recap” document, containing details of the cargo such as ‘laycan’ dates, loading and discharge ports and speed advisories. Once formulated, the recap must be made available to the vessel's captain for any final queries or clarifications.

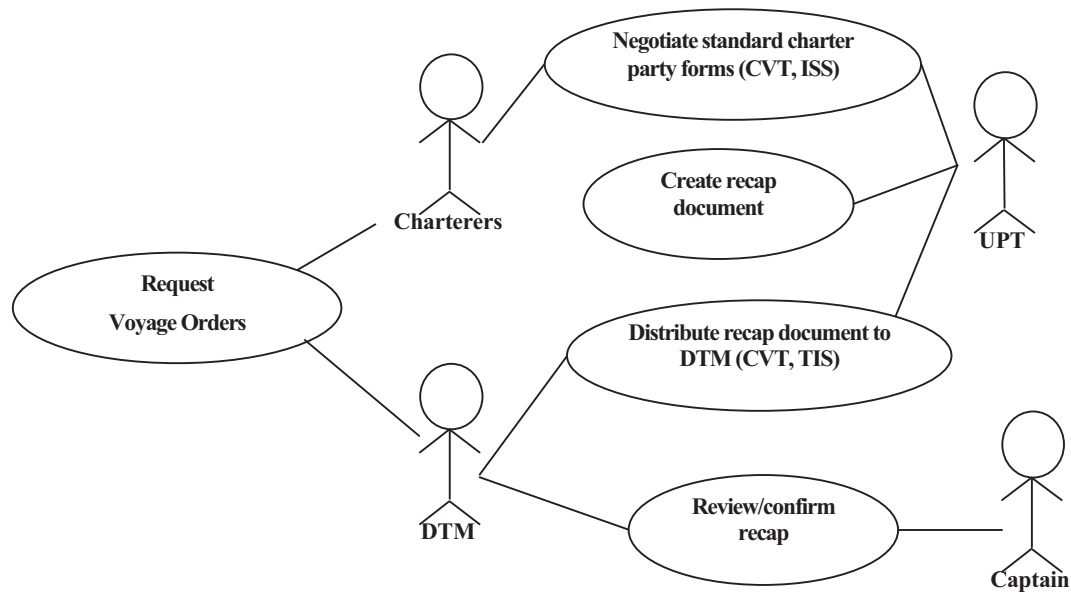


Figure 57 - Use Case 1: Formulating the Recap Pre-Fixture Document

Figure 57 shows in the form of a UML use-case diagram the aforesaid tasks performed for formulating the recap pre-fixture document. As illustrated in the figure, the Charterers and UPT (United Product Tankers) negotiate the standard charter party forms in order to produce the recap document. The recap document is then distributed to DTM who in turn sends this to the vessel's captain for any outstanding clarifications or queries. Using the recap, DTM may already instruct the captain of the ship to begin the voyage towards the general geographic area identified (e.g. Eastern Mediterranean). At this point DTM will request precise voyage orders that contain more specific details, such as the specific load/discharge ports, details regarding the cargo (e.g. exact tonnage) as well as issues like draft restrictions at the load port (e.g. depth of port).

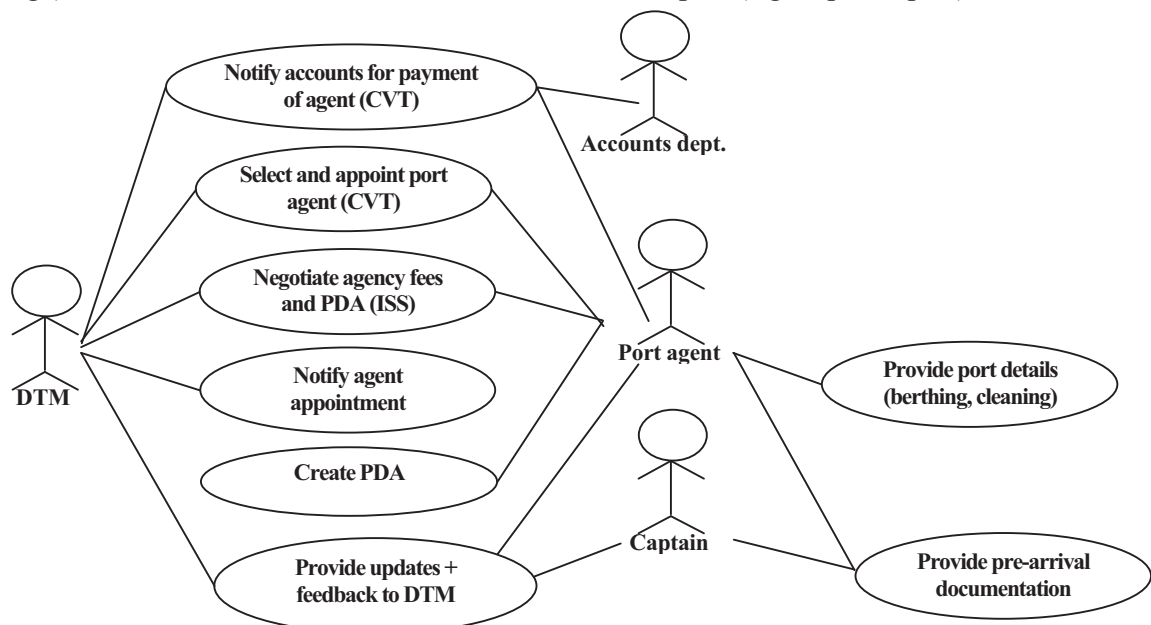


Figure 58 - Use Case 2 – Creation and Settlement of the Proforma Disbursement Account (PDA)

The second business use-case refers to the process executed so as to formulate the Proforma Disbursement Account (PDA). The PDA details the estimated costs that a Port Agent will have to pay for the vessel to have a smooth and quick turnaround at the port (e.g. harbor and pilot

dues, towage expenses). DTM identifies and appoints a suitable Port Agent on the basis of skills such as personal trust, voyage management, voyage establishment, etc., with whom the DTM operator negotiates the terms of the PDA. The main article up for negotiation between DTM and Port Agent are the agency fees. Once PDA terms are agreed the DTM operator notifies the DTM accounting department for arranging the payment of the fees related to the appointment of the Port Agent and forwards the PDA to the captain. The process continues by direct communication between the captain and the Port Agent for the execution of the loading and discharge procedures at the starting and destination ports. Furthermore, daily updates are communicated to DTM by both the captain and the Port Agent. After completion of the process described above, the Port Agent sends the final disbursement account to DTM (the PDA is an accurate estimate of costs). At this point DTM can “close” the voyage using the DA-Desk legacy system.

Figure 58 presents the UML-based use-case diagram, where DTM and the Port Agent negotiate the terms of the PDA. First, the agent is commonly appointed by the ship owner, i.e. DTM operator, to begin negotiations with. The main article up for negotiation between DTM and the port agent are the agency fees. When agreement is reached, DTM uses the DA-Desk system to notify on the appointment of the specific agent. Then, the DTM operator forwards the PDA to the captain. Once the PDA is finalised, DTM notifies its accounting department for settlement of the fees. The process continues with communication between the captain and the port agent for execution of the discharge and turn-around procedures. Upon completion of the process, the port agent sends the final disbursement account to DTM. Thus, DTM closes the voyage in Da-Desk.

4.2.3.2 Objectives

The objectives of this work are to validate, test and establish the efficiency and effectiveness of the COIN platform by reducing the time and simplifying the execution of the processes in the maritime shipping domain. In particular, through the selected use cases, the aim is to simplify and expedite the establishment and management of a voyage, which involves highly interactive processes executed by several parties of a highly distributed team. The weaknesses identified are related to the current communication methods used in tasks such as voyage terms negotiations, information and documents trusted sharing, chat and voice communication, etc. In particular, these tasks are accomplished mainly by exchanging emails and phone calls. This is a major weakness not only because the task of exchanging emails is time consuming but also because it becomes difficult for the mediator party (i.e. DTM operator) to coordinate and organize correctly the communication between the involved parties. Therefore, it was deemed essential to perform the necessary technological developments, in order to drive the required business processes and allow executing efficiently these complex processes.

4.2.3.3 Supporting the Maritime Sector using the COIN platform

On the basis of the use cases described in Section 1, the necessary COIN services provided by the COIN platform were identified. Moreover, additional extensions/services were developed in order to achieve smooth integration with COIN services and support as a result the specificities of the maritime shipping domain. Thus, specific services were selected that can aid and simplify tasks of the processes that are namely: negotiations of voyage terms, information and documents trusted sharing and management of relations of the human collaboration team. From the pool of services [4] provided by the platform a number of COIN Enterprise Interoperability (EI) services were chosen. These services are: Interoperability Space Service (ISS) [3], Trusted Information Sharing (TIS) [1] and the Collaboration Visualisation Tool (CVT) [2]. Furthermore, the COIN Baseline Communication Services were used to support efficiently the necessary communication tasks.

Foremost, the ISS service provides the capability to exchange and negotiate details and terms of various documents in Universal Business Language (UBL) format. Also, the TIS service offers flexible sharing of business-related information and documents based on the strength of relations

established from previous business interactions [7]. In specific, the TIS service allows sharing parts of documents by defining different sharing rules for diverse partners, on the basis of relations. The CVT service is highly-related to the TIS service since it provides a tool that visualises the human collaboration network; COIN users and their discovered relations. Relations may rely on prior joint activities and interactions (e.g. voyage management). Finally, the COIN Baseline Services allow direct communication amongst partner using different communication formats such as email, group chat, Skype instant messaging and Skype voice call. Direct communication is crucial during the execution of the maritime processes and thus is provided in tasks such as informing partners that a new task has been assigned to them or discussing with the vessel captain that requires some clarifications on the voyage.

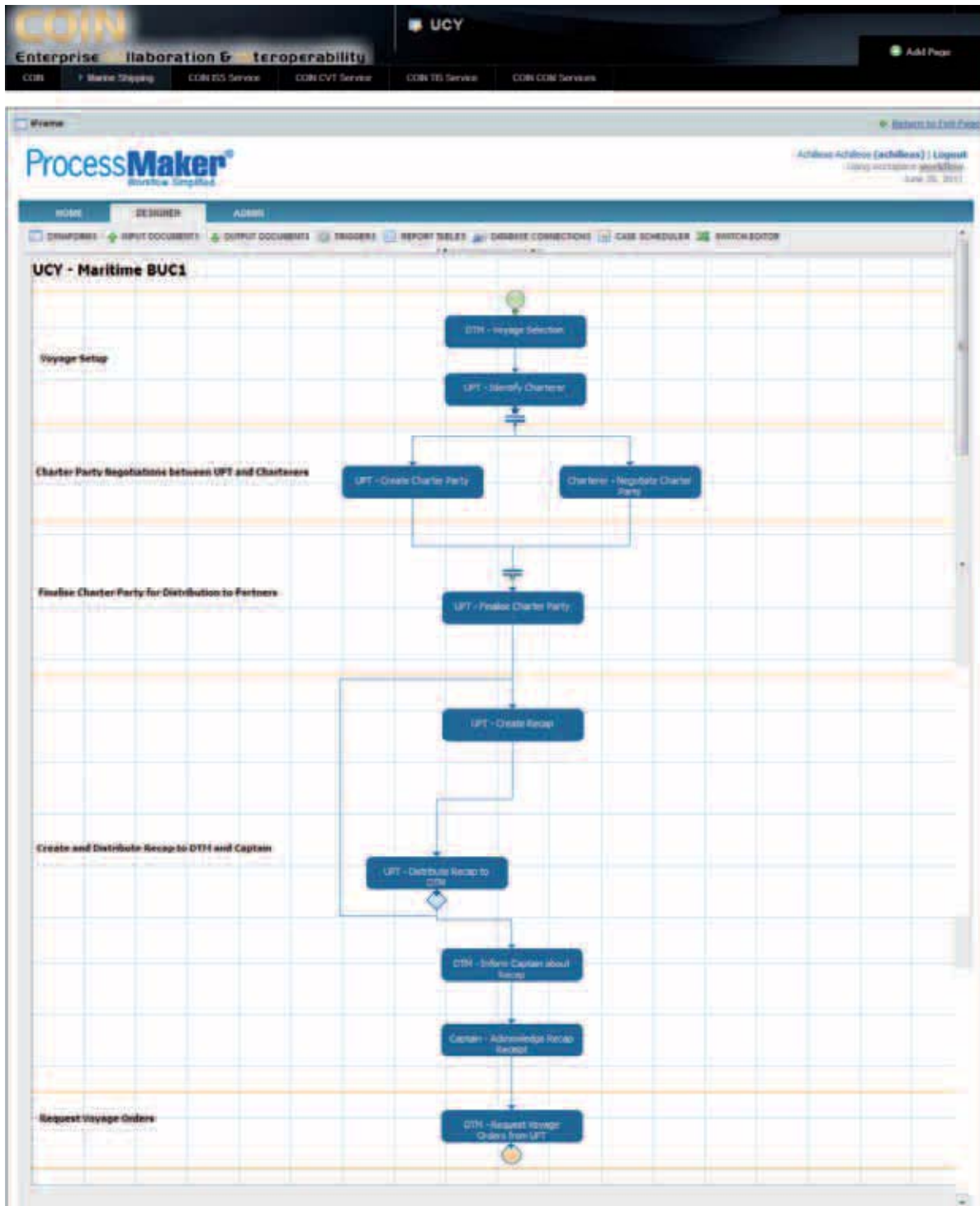


Figure 59 - Use Case 1 – Formulation of the Recap Voyage Document using ProcessMaker

Figure 59 illustrates part of the formulated workflow process for the first business use-case that refers to the “Formulation of the recap voyage document”. As aforesaid, the business process is defined using the ProcessMaker application [5] of the COIN platform, which allows creating, assigning and executing business tasks. These tasks (e.g. Voyage Selection) can be associated with forms, users and web service triggers (i.e. invoking COIN services), so as to carry out successfully business processes. For instance, the primary task shown in Figure 59 (i.e. Voyage Selection) is assigned to a DTM employee and is associated to the form shown in Figure 60. This enables a DTM employee to start a new business use-case (see Figure 60), as soon as a new voyage fixture arises and needs to be negotiated and decided. Figure 60 showcases actually that

the assigned DTM employee acts a business use-case partner, rather than a developer, using though the same COIN service platform portal.



Figure 60 - Initialisation of the recap document business use-case

4.2.3.4 Business Benefits

The benefits provided by the COIN platform, in terms of collaboration and interoperability, can be measured by identifying relevant business indicators. This allows measuring the changes and improvements in business process parameters, on the basis of the business indicators. Using the Value Reference Model (VRM) [9] and on the basis of the developed pilots, the proper business indicators have been identified and selected that aid the quantification of results.

Table 5 - Preliminary Results using the VRM model processes and metrics

	VRM Process	Meaning	Metric	Value Before Using COIN	Expected Benefit [%]	Expected Value After Using COIN
BUC1	GS03 – Govern Supply Chain Information	Time to complete process plan	Velocity	24 – 72 hours	30	17 – 50 hours
	A5 – Place Order	Negotiating/distributing/reviewing/confirming recap	Velocity	16 – 48 hours	30	11 – 34 hours
BUC2	GS03 – Govern Supply Chain Information	Time to complete process plan	Velocity	24 – 72 hours	30	17 – 50 hours
	A5 – Place Order	Negotiating/distributing/reviewing/confirming PDA	Velocity	16 – 48 hours	30	11 – 34 hours

VRM supports key issues and gears together processes within and between individual units of networks for the benefit of: (i) Planning, (ii) Governing and (iii) Execution (information - financial - physical flows). The model’s objective is to increase the total chain performance and support evolution [9]. In particular, VRM employs a common, process-based language of syntax and semantics and enables the successful application of SOA-enabled practices. On the basis of the VRM model the following business benefits have been identified: (i) reduction of lead time in decision making and reaction to arising problems, (ii) improve the efficiency of processes and (iii) reduce barriers of a geographically distributed team. These benefits drive the selection and measurement the velocity metric defined in the VRM model [9]. At this point the initial pilots have been implemented and tested with the following preliminary results shown in Table 5.

4.2.3.5 Conclusions and Lessons Learned

One of the most important objectives in the maritime sector (or any other logistics sector for that matter) is fast decision making and reaction in arising problems. Reducing communication time between partners using COIN Baseline Communication services, will lead to the successful management of multiple voyages through timely completion of individual tasks. Furthermore, the use of the COIN platform's EI Services can improve in overall the efficiency of collaboration and interoperability processes executed by these partners. Thus, negotiation (ISS), information and document sharing (TIS) and collaboration (CVT) services as part of the COIN EI services can contribute to the overall efficiency of processes. The management of shipping voyages overlaps geographical barriers. This means that vessels managed by DTM can be in different locations. Also the charterers and the agents can be in any country in the world. Hence, DTM has to be in continuous communication with the vessel as well as the charterers and the agents. Also, DTM may need to monitor negotiations between other parties, which are not located at the same place. Consequently, the use of the common COIN portal and the provided (selected) services can reduce the barriers faced by such a geographically distributed team.

References

- [1] Collaboration and INteroperability (COIN) EU IP 2010a, "Deliverable D4.5.2b – Annex III – Trusted Information Sharing Service (TIS) Final Factsheet".
- [2] Collaboration and INteroperability (COIN) EU IP 2010b, "Deliverable D4.5.2b – Annex I – Collaboration Network and Visualization Tool Service (CVT) Final Factsheet".
- [3] Collaboration and INteroperability (COIN) EU IP 2010c, "Deliverable D4.5.2b – Annex I – Interoperability Spaces Service (ISS) Final Factsheet".
- [4] Collaboration and INteroperability (COIN) EU IP 2011, "Service Terminology – COIN Services Repository", Available Online: <http://www.coin-ip.eu/intranet/wiki/cross-wps/service-terminology?searchterm=service+termino>.
- [5] Colossa, Inc. 2000, ProcessMaker Workflow Simplified, Available Online: <http://www.processmaker.com>.
- [6] Cyprus Shipping Chamber (CSC) 2010, "Cyprus: A Leading Maritime Center", Available online: <http://www.csc-cy.org/tmp/28433223.pdf>.
- [7] Skopik, F., Schall, D., Dustdar, S., 2010, "Trust-based Adaptation in Complex Service-oriented Systems", IEEE International Conference on Engineering of Complex Computer Systems (ICECCS).
- [8] PriceWaterhouseCoopers (PWC) Cyprus 2010, "Cyprus shipping: A sea of opportunities", Available online: http://www.pwc.com/cy/en/publications/assets/pwc-cy_shipping_sep10.pdf.
- [9] Value Chain Group (VCG) 2004, Introduction to the Value Reference Model (VRM), Available Online: <http://www.value-chain.org/en/cms/1960/>.