Input paper: [[1]](#footnote-1) ENAV22-9.6.1

Input paper for the following Committee(s): check as appropriate Purpose of paper:

**□** ARM **□** ENG **□** PAP **□** Input

X ENAV **□** VTS **X** Information

Agenda item [[2]](#footnote-2) n.n

Technical Domain / Task Number 2 …………………………………

Author(s) / Submitter(s) Gaeil An and Byungho Chung (ETRI, Republic of Korea)

Thomas Christensen, Jinki Jung, and Jinhyoung Park (KRISO, Republic of Korea),

Seongsang Yu and Kaemyoung Park (KR, Republic of Korea)

The concept of ID import service for registering a large number of entities in MCP

# Summary

To issue an entity identity (ID) at the current Maritime Connectivity Platform (MCP), ID administrator must manually enter entity information into Maritime Identity Registry (MIR) server. This method has no problem if the number of vessels to which ID is issued is small. However, if the number of entities is very large, it would be a great inconvenience and difficulty for ID administrator.

This document proposes an ID Import (IDI) service, which can efficiently issue bulk entity IDs using the legacy entity data managed by a system in the non-MCP domain. The entities covered by the IDI service include users, devices and vessels, but this document focuses on vessels. The IDI service consists of IDI server, Maritime Identity Registry (MIR) server, and Legacy Ship Management (LSM) system. The IDI server can convert the ship data managed by the LSM system into the MCP vessel IDs and directly register them in MIR server.

## Purpose of the document

The purpose of this document is to introduce the concept of IDI service and to help MCP developers and users understand its necessity, conceptual architecture, and operational scenario.

The IDI service proposed in this document can be provided by any organization. So, it can be deployed on MCP as one or more IDI instances.

## Related documents

* Maritime Cloud – Conceptual Model(Input paper to ENAV20, ENAV20-9.19)
* Identity Management and Cyber Security(Input paper to ENAV19, ENAV19-9.5)

# Background

In MCP, there are five entities: organization, vessel, user, device, and service. Once an organization is created in MCP, the ID administrator of the organization can create and manage entities that belong to that organization. This document deals with issue that arise when an organization's ID administrator creates a large number of entities. This document can be applied not only to vessels but also to users and device entities, but it focuses on vessels.

In MCP, MIR server is responsible for registering and managing vessel IDs. In order to issue a new vessel ID, an ID administrator must input vessel information directly into MIR server through a MCP-management portal server. Figure 1 shows an example of entering vessel ID using MCP-management portal server. In Figure 1, the MCP-management portal server is responsible for registering the vessel IDs entered by the ID administrator of an organization in the MIR server. The mandatory data that all the organization's ID administrator must enter when issuing a new vessel ID is vessel identifier and vessel name. Here, the vessel identifier is used to allocate a Maritime Resource Name(MRN).

If an ID administrator register a small number of vessels, such as a few or dozens, the data input-based ID issuance method will not cause problems. However, if the number of vessels to which an ID is assigned is enormous, such as thousands or tens of thousands of vessels, the ID administrator will suffer tremendous inconvenience and difficulty.

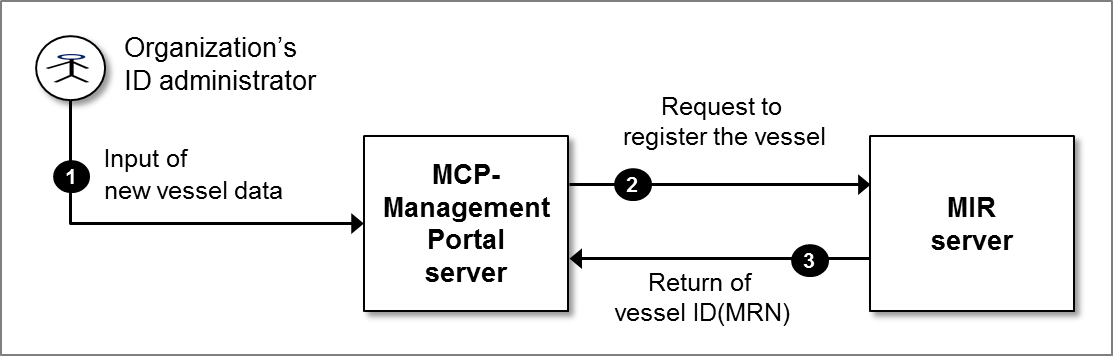


Figure 1 An example of entering vessel ID using MCP-management portal server

When registering a large number of vessels in the MCP, the data input-based ID issuance method has the following problems.

* The vessel registration time is very long.
* There may be a risk of typos in the entered vessel data.
* ID administrator should directly assign vessel identifiers that uniquely identify vessels.

In order to solve this problem, this document proposes a method that can efficiently register a large number of vessels in MCP by using the ship data managed by the legacy ship management system.

# architecture for ID import service

Figure 2 shows the conceptual architecture of ID Import service that allows ID administrators to register a large number of vessels in the MCP. The proposed architecture consists of MIR system, ID Import server and Legacy Ship Management(LSM) system. The MIR system is a core component of MCP and provides user management and authentication function, and the LSM system is one that stores and manages legacy ship data. One example of the LSM system is the GICOMS system in Korea. The GICOMS system collects and manages ship data such as ship name, MMSI, shipping company, and location information for the purpose of the prevention of marine accidents and utilization of the marine rescue system. The ship data managed by the GICOMS system is used as raw data for registering vessels in the MCP. Finally, the ID Import server is a new system proposed in this document and it plays a role of registering a large number of vessels in MIR server through interworking with the LSM system.

The architecture for the ID Import service in Figure 2 is divided into two domains: MCP domain and Non-MCP domain. The two domains are defined in this document as follows.

* MCP domain: a domain that consists of systems directly participating in MCP and entities(i.e., organizations, services, devices, ships and users) registered in MCP
* Non-MCP domain: a domain that consist of systems not participating in MCP and entities not registered in MCP

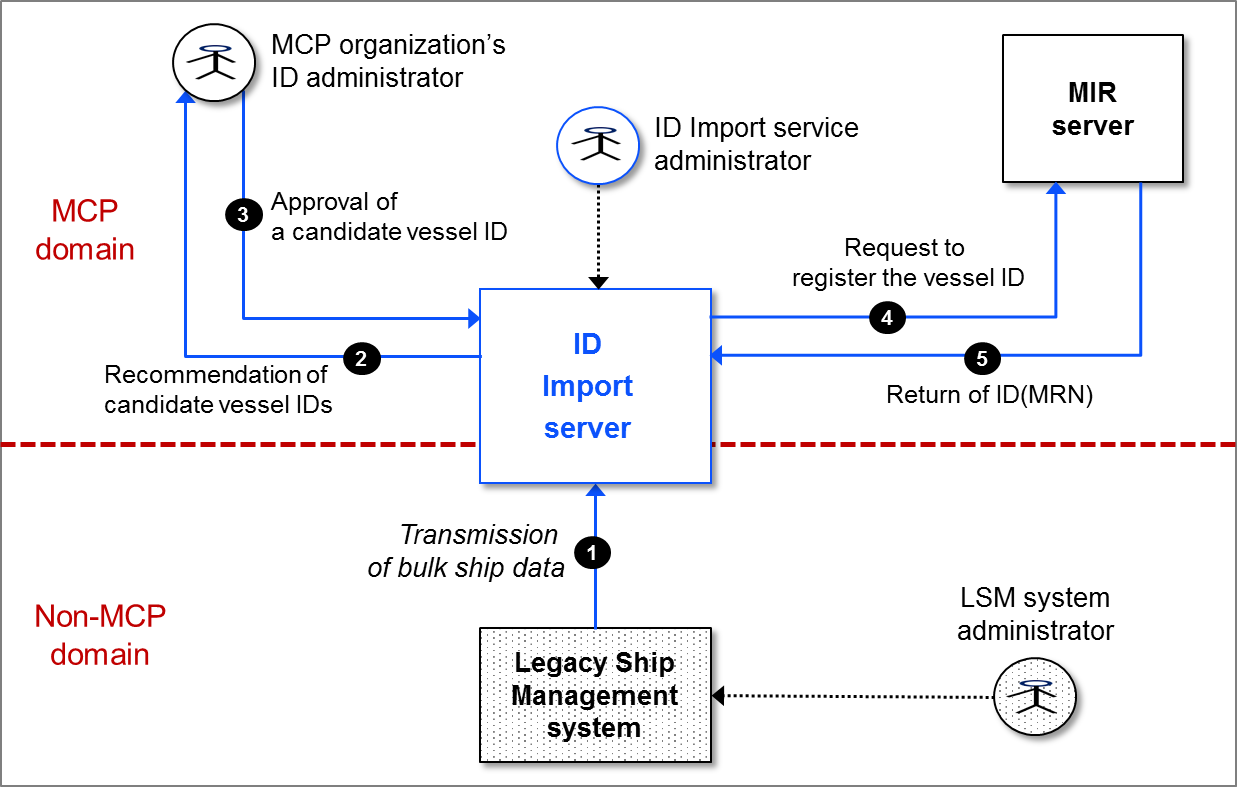


Figure 2 Conceptual architecture for ID Import service

MIR and LSM systems have different characteristics in terms of operational domain. That is, while the MIR system operates in MCP domain, the LSM system operates in non-MCP domain. This means the LSM system does not participate in MCP and the LSM system administrator is not an MCP entity. For this reason, the ID Import server should act as a gateway system that converts the ship data managed by the LSM system into information that can be used in MIR server.

There is an administrator for managing ID Import service. The administrator can be anyone of MCP organization such as an organization administrator or service provider.

In the proposed architecture, the vessel registration scenario is as follows.

1) A LSM system transmits bulk ship data to an ID Import server.

2) The ID Import server analyzes the received ship data and creates candidate vessels to be registered in a MIR server, and then recommends them to the organization’s ID administrator involved to them.

3) The organization’s ID administrator decides whether or not to register the candidate vessels in MIR server.

4) The ID Import server request MIR to registers the candidate vessel at the request of the organization’s ID administrator.

5) The MIR server issues an vessel ID(i.e., MRN) to the requested candidate vessel and return it

# RequirementS for ID Import Server

In this section, ID Import server is introduced in details.

## Functional requirements and external interface

The ID Import server provides function to convert the ship data managed by a LSM system into the vessel information that can be used in the MCP and register it in the MIR server.

Since the ID Import server is provided as an additional MCP service, it has the following basic design philosophy.

* The ID Import server should not affect any MCP core components, including the MIR server defined to register the vessel, in terms of functions and external interfaces (APIs).

The functional requirements that ID Import server should provide are follows:

* Secure legacy ship data transmission: When receiving legacy ship data from a LSM system, the ID Import server should provide authentication and data integrity functions.
* Different types of ship data transmission methods: ID Import server should provide different types of data transmission methods to receive ship data from various kinds of LSM systems. Examples of such methods include record-based transmission methods, such as open protocol (REST API) and private protocol, and file-based transmission methods through email and FTP protocols.
* Unique vessel ID generation: ID Import server should provide function to generate unique vessel ID so as to create new unique MRN.
* ID administrator authentication: ID Import server should be able to authenticate ID administrators connecting to the IDI server.
* Recommendation of registration candidate: If an ID administrator accessing to an IDI server is authenticated, the IDI server should be able to provide function of selecting and recommending only the vessels belonging to the organization of the administrator.

The ID Import server has three external interfaces:

* Interface with LSM system: interface\_for\_LSM\_2\_IDI
* Interface with ID administrator: interface\_for\_IDI\_2\_IDAdmin
* Interface with MIR server: interface\_for\_IDI\_2\_MIR

The two interfaces, the interface with LSM system and the Interface with ID administrator are newly defined in this document. However the Interface with MIR server, interface\_for\_IDI\_2\_MIR is not newly defined, but uses the interface defined in MIR server. So to apply the IDI server to MCP does not require any modification or expansion of MIR source program.

Table 1 is the data model defined for the interface (interface\_for\_LSM\_2\_IDI) between a LSM system and an IDI server, which has been designed by referring to that of the MIR server. All the LSM systems should follow the generic data model for interoperability when transmitting ship data to the IDI server. For this, the LSM system should be able to map its ship data to the data format shown in Table 1.

Table 2 shows the data model for the interface (interface\_for\_IDI\_2\_IDAdmin) between the ID administrator of a MCP organization and the IDI server.

Table 1 Data model for interface between LSM system and IDI server

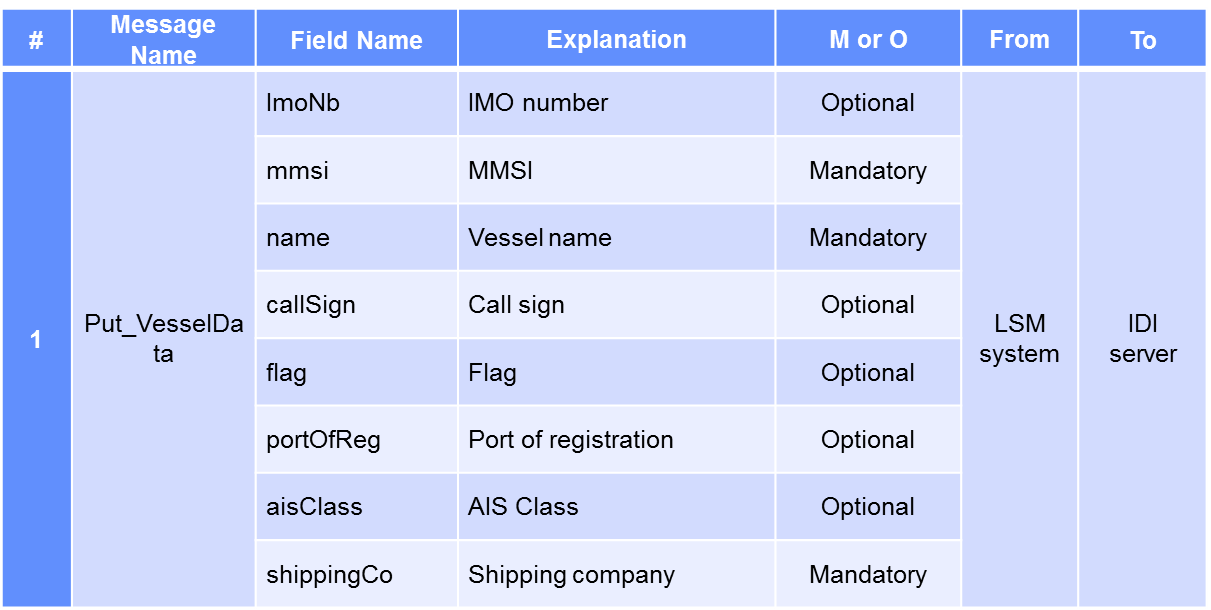
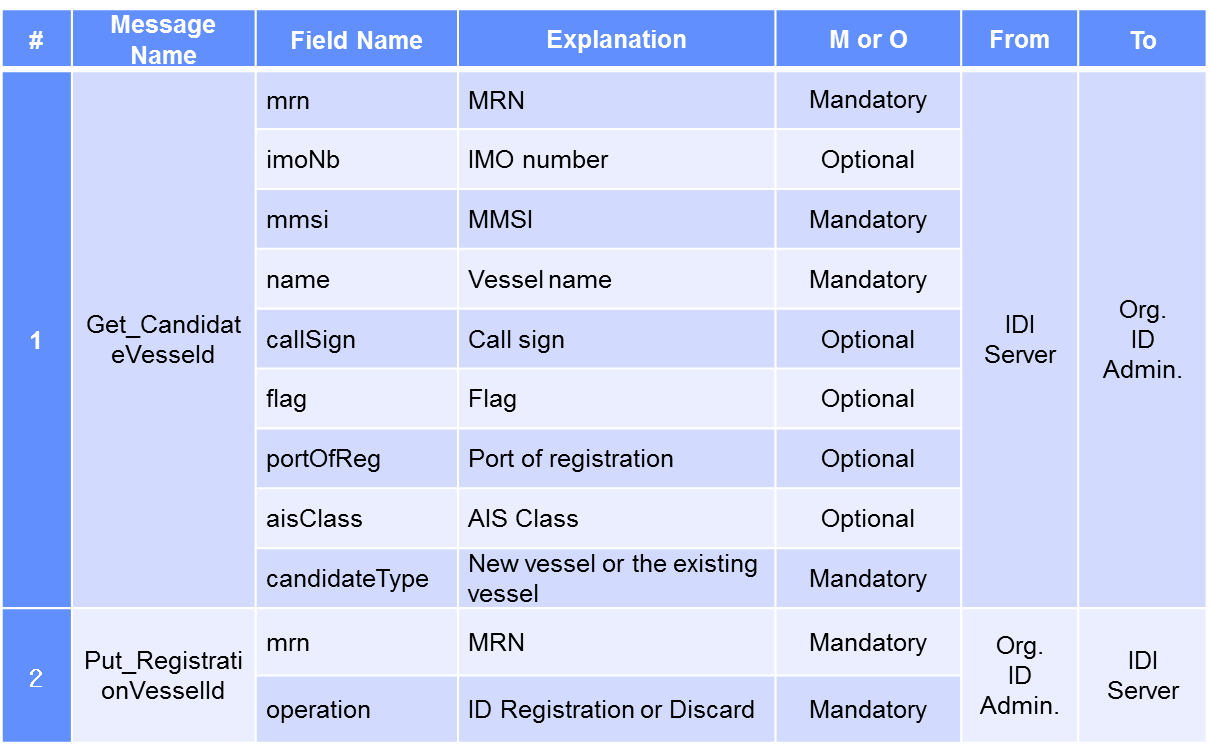


Table 2 Data model for interface between ID administrator and IDI server



## Sequence diagram

Figure 3 shows a sequence diagram for issuing IDs to a large number of vessels using bulk ship data. In this sequence diagram, the MIR server is divided into two servers, an ID Management (IDM) server that provides the ID management function and an ID Provider(IDP) server that provides the authentication function.

The components in the sequence diagram operate as follows.

(1) A secure communication channel is established between the LSM server and the IDI server.

(2) The IDI server receives bulk ship data from the LSM server. It removes duplicated data from the received data.

(3) If an ID administrator logs in to the IDI server, the IDI server first authenticates the ID administrator through the MIR-IDP server. If the ID administrator is certified, she/he can access the IDI server.

(4) If the IDI administrator requests the IDI server for candidate vessel IDs, the IDI server searches for ship data which belong to the ID administrator. And then to see if IDs for the ship data are issued, the IDI server request the MIR-IDM server to retrieve vessel data by MRN.

(5) If the IDI server receives the retrieval result from the MIR-IDM server, it creates candidate vessel IDs by analyzing the received result and then returns them to the ID administrator.

(6) The ID administrator decides whether or not to register candidate vessels in the MIR-IDM server. The ID administrator approves the registration of a candidate vessel and requests the IDI server to handle it.

(7) The IDI server request the MIR-IDM server to register the candidate vessel.

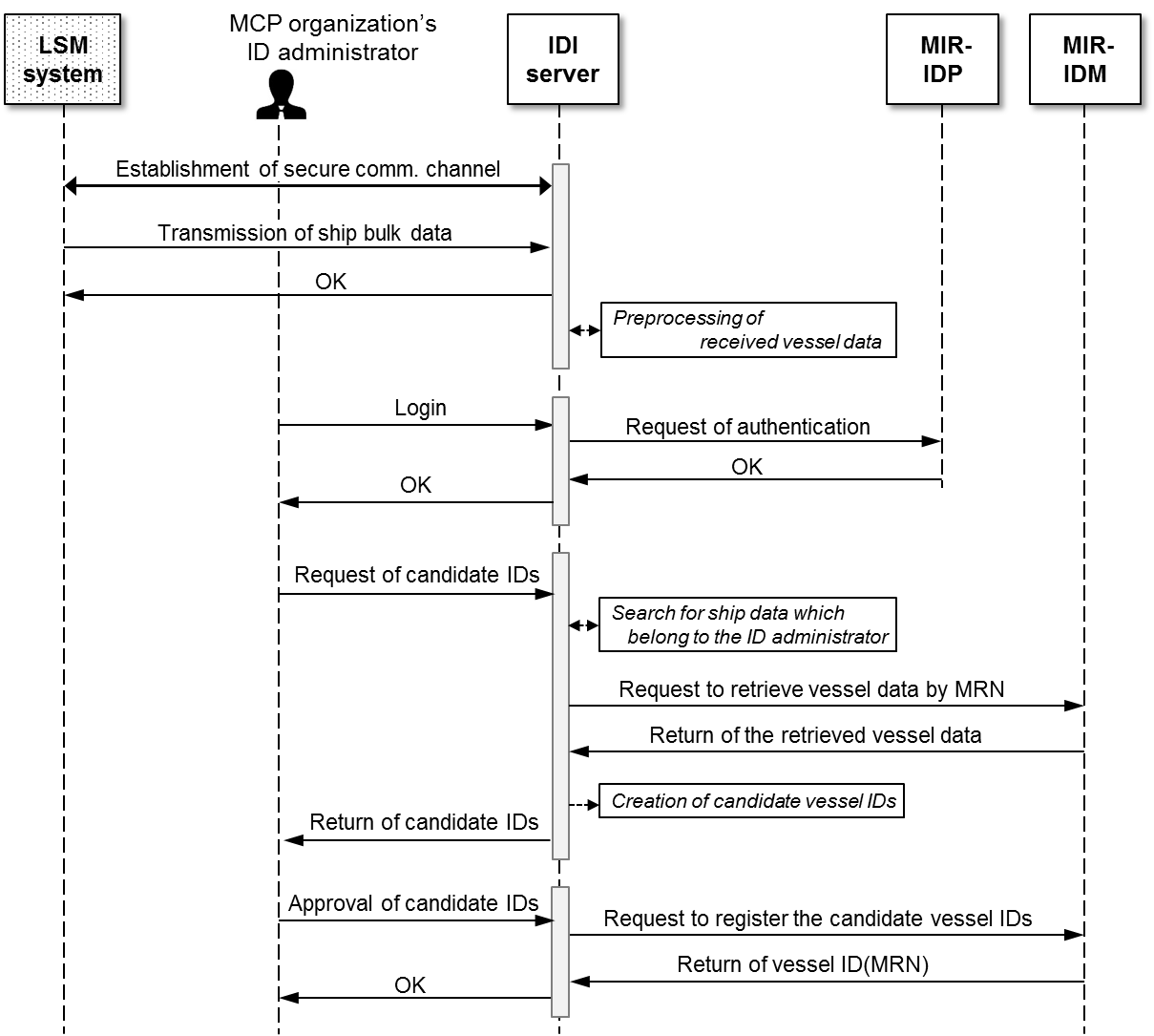


Figure 3 Sequence diagram

# USE CASE of ID Import Service

There is a SMART Navigation project to develop Korean MCP service. The project expects the number of vessels to which MCP ID is to be issued is more than 80,000. It would be difficult for an ID administrator to enter 80,000 vessels directly into the MIR server. This is why the SMART Navigation project is developing an IDI server. IDI server can easily register a large number of ships in MIR server using legacy ship data.

Figure 4 shows an example of issuing MCP ID to a large number of vessels in the SMART Navigation project. In Figure 4, the MCP vessels indicate entities that can use the service provided by the MCP service provider because they have MCP ID issued in the MIR server. On the other hand, NON-MCP vessels indicate entities that do not have MCP ID. The GICOMS system collects all ship data in Korea through Vessel Traffic System (VTS).

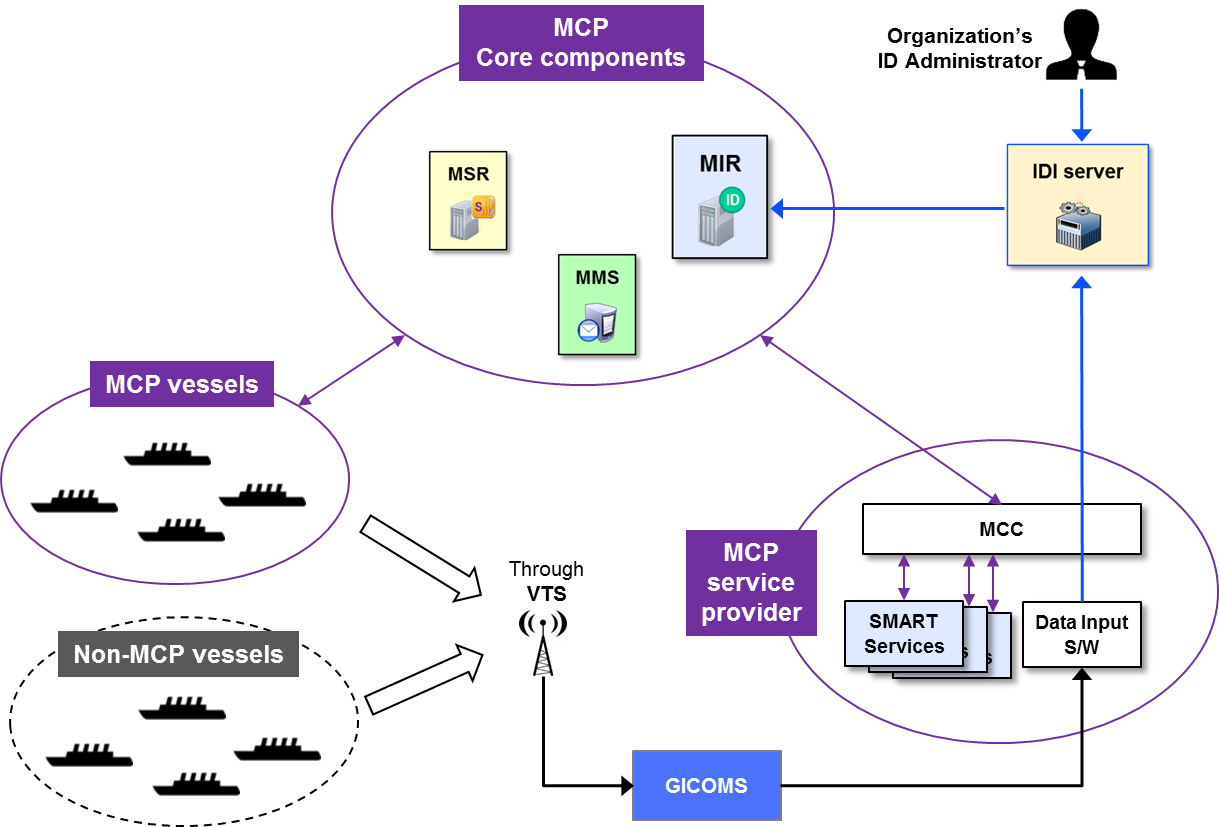


Figure 4 Use case in SMART navigation project

The use case introduced in this document works as follows. The ship data managed by the GICOMS system is delivered to the IDI server through the Data Input SW and MCC system built in the MCP service provider. The IDI server registers the delivered ship data in the MIR server according to the instruction of the ID administrator. As a result, 80,000 new vessel IDs can easily be issued.

# References

[1] “MCP Identity Platform,” <http://developers.maritimecloud.net/identity/index.html>

[2] “MCP Management Portal - User Guide,” https://manual.maritimeconnectivity.net/

[3] ENAV20-9.22, “Maritime Resource Names (MRN),” IALA, 2017

# Action requested of the Committee

The Committee is requested to:

1. This paper is for information and requires no action by the Committee.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)