French Pilot study for WP4

D12
4.3.14 CISE

PILOT STUDY AND TESTING REPORT

French Hydrographic and Oceanographic Service (Shom)

Document Control Sheet

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This type of project is definitely a team work and we could not have done this alone. We are looking forward to building on this network in the coming years and projects.

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Acronyms

API	Application Programming Interface
BEA	French Marine Casualties Investigation Board (*Bureau d'enquêtes sur les évènements de la mer*)
CISE	Common Information Sharing Environment
COFGC	French Coast Guard Committee (*Comité français des gardes-côtes*)
CSW	Catalogue Service for the Web
DAM	French Maritime Affairs Directorate (*Direction des affaires maritimes*)
DDGI	French Directorate General of Customs and Indirect Rights (*Direction des douanes et des droits indirects*)
DG MARE	Directorate-General Maritime Affairs and Fisheries of the EU
DIRISI	French Forces Joint Directorate for Infrastructure Networks and Information Systems (*Direction interarmées des réseaux d'infrastructure et des systèmes d'information*)
DMZ	Demilitarized Zone
EFCA	European Fisheries Control Agency
ENC	Electronic Navigational Charts
EMM	French Naval Service (*Etat Major de la Marine*)
EMSA	European Maritime Safety Agency
EU	European Union
IT	Information Technology
JRC	Joint Research Centre
MARSUR	Maritime surveillance dialog
MRCC	Maritime Rescue Coordination Centres
MS	Member States
ncWMS	NetCDF Web Map Service
PING	Navigational warnings production tools (*Plateforme de l'information nautique géographique*)
PREMAR	French Maritime Prefect (*Préfecture maritime*)
SAR	Search and Rescue
SGMER	French General Secretariat for the Sea (*Secrétariat général de la mer*)
Shom	French Hydrographic and Oceanographic Service (*Service hydrographique et océanographique de la marine*)
VLAN	Virtual Local Area Network
VM	Virtual Machine
VPN IPSec	Virtual Private Network Internet Protocol Security
WMS	Web Map Service
WMS-r	Web Map Service Raster
WMS-v	Web Map Service Vector

1. Introduction

1.1. Context

Enhanced cooperation and smooth-flowing exchange of information between maritime surveillance authorities is today one of the main strategic objectives of the EU (European Union) in the framework of the Integrated Maritime Policy and a key component of the European Maritime Security Strategy[1].

Since 2006, the European Commission has worked to improve cooperation across the maritime surveillance authorities of the Member States (MS) and to enhance the interoperability of their respective data systems (also called legacy system), both at National and European levels. The information exchange systems Europol (criminal and terrorist networks), MARSUR (maritime surveillance dialog) and SafeSeaNet (vessel traffic monitoring and information system) are good examples of such collaboration work.

Today, the exchange of maritime information between various maritime authorities at National and European level is still complex and limited, mainly because of the lack of interoperability of surveillance systems and the existence of legal barriers (national policies, etc.). Maritime surveillance stakeholders continue to produce, collect and use geographical information very often separately, without taking advantage of data sharing. This data can then be collected several times, leading to unnecessary operating costs and a loss of efficiency[1]. The development of the Common Information Sharing Environment (CISE) network, another European initiative within the framework of the Integrated Maritime Policy, aims in particular to overcome these limitations while meeting information needs not already covered by existing networks[2].

The Mediterranean governance for Strategic Maritime Surveillance and Safety issues (MED OSMoSIS) strategic project aims to tackle this complexity through the development of tools/applications and the implementation of pilot studies that will enable the improvement of information exchange between different authorities and MS.

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[1] Better situational awareness by enhanced cooperation across maritime surveillance authorities: next steps within the Common Information Sharing Environment for the EU maritime domain (2014). *Communication from the Commission to the European Parliament and the Council*, COM(2014) final, 1-8.

[2] Integrating Maritime Surveillance – Common Information Sharing Environment CISE draft roadmap (2010). Communication from the Commission to the Council and the European Parliament, COM(2010) 584 final, 1-28, doi:10.2771/64104).

1.2. The MED OSMoSIS project

MED OSMoSIS is a strategic project funded by the Interreg MED programme that consists in promoting the implementation of improved governance and data exchange among different actors of the Mediterranean Area towards the policy development of Integrated Maritime Surveillance in the EU.

MED OSMoSIS brings together 10 partners from 8 coastal States of the Mediterranean: Greece – as the Lead Partner – Croatia, France, Italy, Montenegro, Portugal, Slovenia and Spain. It gathers public scientific institutions and national authorities in charge of navigation safety and maritime surveillance. The project focuses on the development of modules and applications regarding maritime surveillance activities – in terms of safety and security – to facilitate information exchanges. The overall target is to support interoperable transnational sectoral systems, ensuring their regional, deployable and mobile interface, in order to enhance In-situ Situational Awareness, wherever needed in the Mediterranean Sea and Atlantic approaches.

Three pilot activities were performed in the project, each enabling to test the tools developed and implemented:

- ***Greece and Spain*** *– Search and Rescue (SAR) Planning: Testing of tools, methodologies and algorithms for SAR operations;*
- ***Italy*** *– Improvement of the cycle management of information necessary for the update of cartography to ensure safety to marine users;*
- ***France*** *– Development of **an API (S-124) for the production and diffusion of Navigational Warnings by web services (FR/EN); Study on CISE to assess the process and needs for the integration of Shom's data into the French CISE network (detailed hereunder)***.

In particular, the project explored the application of current guidelines and capabilities of the ongoing evolution of the CISE (Common Infrastructure Sharing environment) data exchange model. It carried pilot activities and capitalization actions to test, disseminate and distribute the tools and protocols developed among partners either as being potential users but also as intermediaries to reach other participant entities.

1.3. Purpose of the document

The document hereafter presents the work and results of the pilot study dedicated to CISE. Shom is producing and disseminating data using standards which were not compatible with the CISE environment and data model before this project. Therefore, the main topic of this study was to enable

the integration of Shom's data into the CISE network and to perform tests in order to ensure the connection and data sharing from its servers with CISE. After introducing the main elements of the pilot study, the technical and financial requirements, the set up implemented are presented to finally show the tests realized and the limits and perspectives emerging from the results.

2. CISE Pilot Study

2.1.   CISE Network

The Common Information Sharing Environment (CISE) project was launched in 2009 by the European Commission (DG MARE). Since 2019, CISE is in a transitional phase between the development of the network and its operational status. This phase is managed by EMSA.

CISE aims to set up an operational and decentralised system for the sharing of data related to maritime surveillance activities. The CISE network is dedicated to the 7 main maritime surveillance areas: Maritime safety and security (including SAR operations and prevention from shipping pollution), Marine environment safety (marine pollution preparedness and response), Fisheries control, Border control, General law enforcement, Customs and Defence. The network involves key civil and military authorities from EU Member States holding useful data and several European bodies (EC, EEAS, EDA, EFCA, EMSA, Frontex and SatCen).

The objective of CISE is to develop an information-sharing platform based on existing - or under development - surveillance systems within the Member States (MS) and European agencies[3] in order to improve data and information exchange between MS. In other words, the aim is to establish a common language of exchange for all maritime surveillance stakeholders. CISE is not an application, software, programme or interface. The data shared within the CISE network involves any data related to the maritime domain, with a priority for safety and security. Any actor willing to exchange maritime surveillance data can join the network on a voluntary basis.
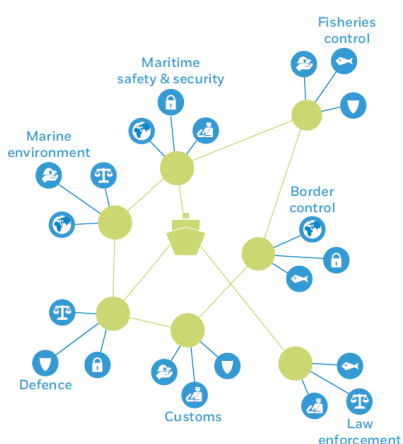

Figure 1: CISE: a sharing platform (CISE,2020)

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[3] Organismes et systèmes d'échange d'information multinationaux contribuant à la sûreté maritime (2015). *Etude prospective et stratégique de la DGRIS*, Ministère de la Défense, 1-47.

CISE complies with national and European legislation for the recording, sharing and use of data, guaranteeing the protection, security and confidentiality of sensitive information, whether personal, private or operationally strategic.

Ultimately, CISE will provide the MS maritime surveillance stakeholders with optimised situational awareness. The exchange of up-to-date operational information (e.g. Navigational Warnings) will reinforce the maritime authorities' efficiency within each MS and help reduce operating costs, in particular through the pooling of data in a unique secure environment.

2.2. Shom's data

2.2.1. Datasets of interest when dealing with operations at sea

Shom, thethe French hydrographic office,provides French maritime stakeholders with crucial descriptive information and predictions related to the marine physical environment, navigation safety and administrative limits.

The French maritime surveillance end-users for Shom's datasets are currently the Maritime Prefectures, the Maritime Gendarmerie, the French Marine Casualties Investigation Board (BEA), the Maritime Rescue Coordination Centres (MRCCs).

Data produced by Shom is particularly used to support maritime affairs at sea with regards to incidents and casualty operation management (damage, vessel grounding, human or material loss, pollution…).

The following information ispublished and disseminated through Shomdata portal, the online platform data.shom.fr:

- **Physical environment**
  - *Bathymetry*
  - *Seabed nature*
  - *Coastline*
- **Safety of navigation**
  - *Marine cartography*
  - *Regulatory maritime limits and restricted areas*
  - *Submarine cables and pipelines*
  - *Wrecks and obstructions*

- *Lights and fog signals*
- *Buoys, beacons*
- *Nautical charts[4]*
- **Forecast**
  - *Tides and currents, waves*
  - *Meteorological forecasts*
  - *Oceanographic forecasts*

In addition, French navigational warnings will be disseminated in the future through the upcoming French navigational geographic information online platform, PING, currently under development and subject of another MED OSMoSIS pilot study. A dedicated deliverable is providing further description[5].

2.2.2. Geographical information data: a new kind of data for CISE

Geographical datasets are shared by Shom with users through **Web Map Services (WMS).** This approach to display public data (maps and plotted information) is available in three WMS standards corresponding to different data categories and formats:

- the **WMS-r** for raster data, discrete and continuous geographical information (which can be simplified as pixels) with a legend,
- the **WMS-v** to display vector data with access to information linked to the data[6] (metadata) and,
- **ncWMS** to display netCDF data for forecast which enables the user to set-up the data displayed at a specific time.

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[4] Nautical charts are only available publicly for display; access to details and downloading functionalities are restricted and only available with a subscription.

[5] D.11 WP4.3.12 PING NAVIGATIONAL WARNING S-124 API - PILOT STUDY AND TESTING REPORT (Shom, September 2022).

[6] The detail of the data displayed by data.shom.fr through its web services is presented in a table available in the appendices.
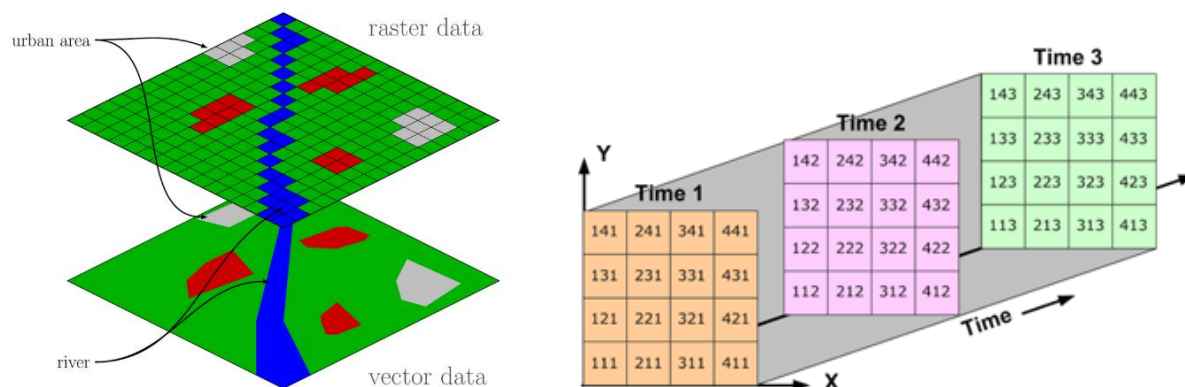
Figure 2: Scheme of the difference between raster, vector data standard and netCDF data.
(https://commons.wikimedia.org/wiki/File:Raster_vector_tikz.png / https://pro.arcgis.com/fr/pro-app/2.9/help/data/imagery/fundamentals-of-netcdf.htm)

Three public services are provided by Shom, corresponding to these three standards listed above, to share its data. A webservice feature to display navigational warnings on GIS softwares is expected to be developed before CISE operational phase.

Unfortunately, WMS standard is not supported in CISE network, by default. For this reason, specific developments were required to address this issue.

In the preliminary study, three use cases described below identify a selection of relevant information available from Shom's data portal (data.shom.fr) to be experimented in CISE:

- Bathymetry and forecasts for description of the marine environment for the execution of action at sea
- Nautical charts as a background
- Sovereignty limits, jurisdictional and SAR zones

Figure 3: Data identified for the use cases displayed on data.shom.fr

CISE is an opportunity for Shom to share those official and enforceable data and services produced in-house, as well as to work closely with both European administrations -such as EMSA, FRONTEX and EFCA- and other French stakeholders involved in maritime surveillance and safety (SGmer, Navy, Coast Guards, Customs…).

Regarding those different sources of data relevant for safety of navigation and to ensure and develop supporting of the French and European coastguard activities, it seems relevant for Shom to integrate the CISE network.

2.3.   Presentation of the pilot study content

The CISE pilot study aims to provide the foundations for the integration of a dataset produced by Shom to the CISE network:

(i)   required technical and human resources,
(ii) selection of datasets to be integrated in the CISE network and
(iii) identification of French and European partners who may access Shom's dataset.

As a reminder, the challenges faced by Shom with this study relate to:

- the format: the format used by Shom to disseminate its data is not initially supported by CISE and Shom intends to be a data provider only within the CISE environment. This situation therefore implies some specific development; the development of a WMS Adaptor is one major requirement to connect Shom's datasets to CISE Network (see §3.1)
- the set-up of a partnership for the implementation of a particular CISE structure dedicated to the pilot study and tests.

This pilot study resulted in the demonstration of the integration of Shom's datasets in the CISE Network. It further details the main actions performed to implement the CISE architecture at Shom and the experimentations conducted to perform the integration of this new kind of data.

3. Actions performed to integrate the CISE Network

3.1. Structure of the CISE Network

The CISE network is based on several components:

- **Legacy Systems** providing datasets from producers. The data is located on these systems. Shom's Legacy System is its data portal data.shom.fr.
- one **or several Adaptors** located between the Legacy System and a national Node. The Adaptors convert the Legacy System data into the common CISE data model. They are used to compile the Legacy System's data types and formats and to make them interoperable with the CISE data model[7]. Several Adaptors can be needed, as a Legacy System can be data provider only, data consumer only, or both. Different Adaptors are developed to provide or to consume data in the CISE Network. The Adaptors are implemented in the data provider's architecture.
- **CISE national Nodes** constitute the interface between the Adaptors of the different Legacy Systems and the rest of the CISE Network. These Nodes manage the reliability, security and data access of the national Legacy systems to which the adaptor is connected. Hence, the development and the implementation of a WMS Adaptor and its registration on the national Node were the main requirements to connect Shom's datasets from data.shom.fr to the CISE Network.
- The **CISE Network** gathers all the data made available by providers. All the requests from the users also transit through the Network from the users to the targeted Legacy Systems.

Figure 4: Main building blocks of the CISE Hybrid Architecture

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[7] http://www.eucise2020.eu/about

3.2.   Partners

In view of the structure of this data sharing project and its European scale, strong cooperative effort is required to integrate the CISE Network, both with entities managing the national Node and technical operators at the European level. Shom has worked with several partners at the national and European levels to achieve this pilot study.

At the French national level, several partners are involved:

- The main partner for this task is **the French General Secretariat of the Sea (SGMer),** owner of the French Node and chair of the national CISE working group.
- For the technical aspects of the connection to the French Node, jointly to the SGMer, the **DIRISI, French Joint Directorate for Infrastructure Networks and Information Systems** has also been involved as the host of the national Node.
  Ahead of the tests, **the DGAMPA** had been identified as a potential partner at the national level and was involved in several exchanges. Leading the French coast guards and involved in CISE through the H2020 EFFECTOR project, their Legacy System "SeaMIS" is identified to perform future user tests to integrate data sharing through CISE.

At the European level, Shom received the support from the **JRC** and **EMSA**:

- The **European Joint Research Center (JRC) is** the technical operator of the CISE project. The JRC developed a prototype Adaptor for Shom's datasets[8]. The particularity of the data type shared by Shom and the successive versions of the CISE Network have led to various exchanges to fine-tune the connection set-ups and to the development of several versions of Shom's Adaptor.
- The evolutions at the Node level have also led to exchanges with **EMSA, the European Maritime Safety Agency**, project coordinator of CISE, which gave to Shom a strong support, jointly with the JRC, by providing a test Node to achieve the pilot study.

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[8] The JRC is mandated by the EU DG MARE to support the integration of datasets into CISE. The development work provided on the adaptor in the MED OSMoSIS is part of this support.

3.3.   Settings and configuration

As presented above, Shom is using the web mapping services approach to share its data, not already handled by CISE. The set-up of a connection between the Legacy System data.shom.fr and the French Node implied to have an Adaptor able to support web mapping services and to convert them into the CISE data model.

The connection to the CISE Network requires IT resources to set up the technical conditions necessary to implement the Adaptors but also at the central level to manage the connection to the national Node.

To achieve this work, the following time schedule was drawn, but the different implementation tests have progressively shown the need for further developments which have modified and shifted this planning.

The pilot study could not have been achieved without the extension granted to the MED OSMoSIS project. The different configuration steps will be presented in the implementation testing part after introducing the financial and technical needs for the configuration set-up to establish the CISE connection from the IT point of view.

*Table 1: Initial and extended timelines in dark and light grey presented in the pilot study.*

	Years					2021										2022				
	Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7
CISE transitional phase																				
Deploiement of the v2 node											FR									
Meeting CISE stakeholder group																				
MED OSMoSIS - 32 month (from 01/11/2019 to 30/06/2022)		M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	
MED OSMoSIS - Testing phase (CISE Study)																				
Investigations																				
Specification development																				
Implementation tests (connections tests)																				
Users integration tests																				
WP4.3.14. Delivrable MED OSMoSIS (Preliminary Study + Pilot Study)				D01												D01				

Concretely, Shom had to implement the Adaptors developed by JRC into its own IT architecture. This implementation required the set-up of a hosting server: a dedicated virtual network (VLAN) was created, almost isolated from the rest of Shom's network. This network is located inside a DMZ[9] where two virtual machines (VM) are implemented to host the Adaptors, one VM for the data provider Adaptor and one for the data consumer Adaptor.

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[9] DMZ : demilitarized zone (subnetwork)

Figure 5: Connexion requirements and Shom's in-house set-up for CISE Network integration.

An internet connection had also been set up between the Adaptor server and the Legacy System (i.e.
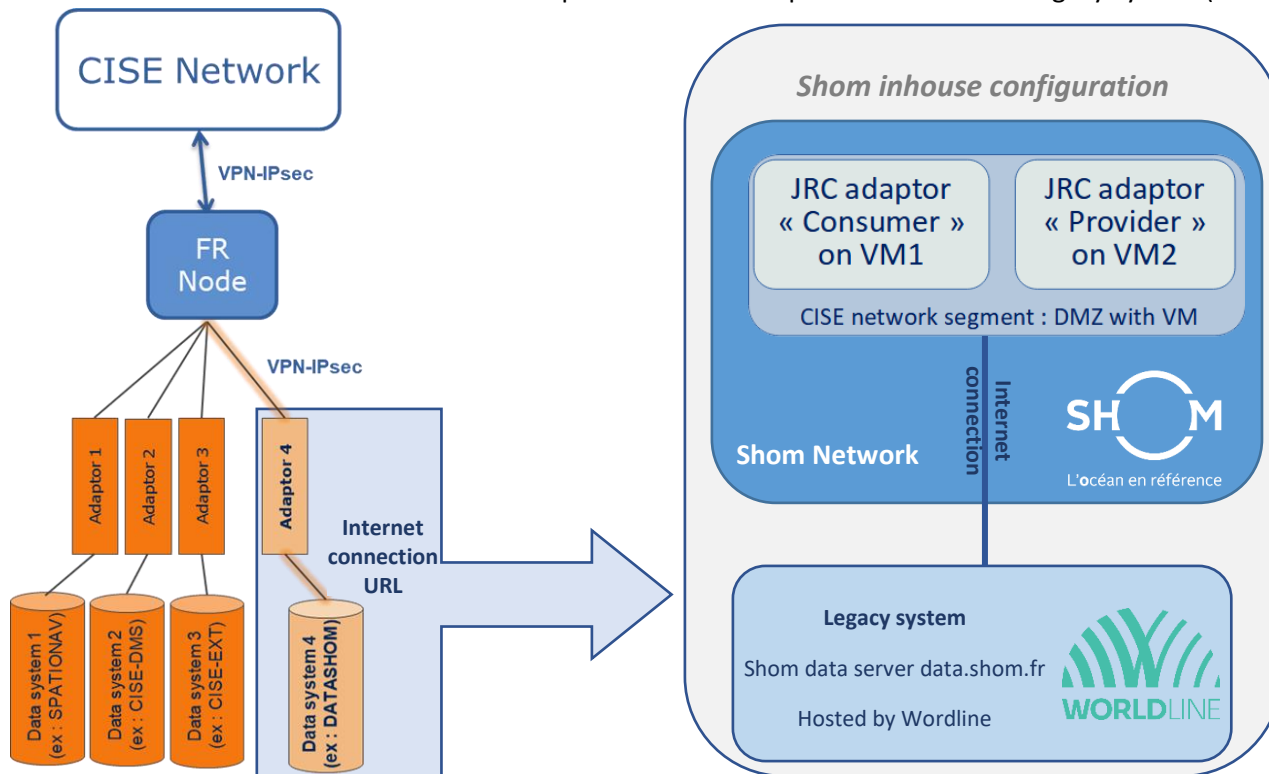
data.shom.fr). In addition, access rights have been configured by Shom within the Legacy System in order to deliver datasets to CISE users upon request.

The server has been connected to the French Node via a VPN IPSec link set up by Shom in collaboration with the French Node's IT administrator. Specific firewall rules allow the Adaptors to send and receive data to/from the Node, through the VPN. Then, the Node administrator has to deliver certificates and to register the Adaptors on the Node. This is a prerequisite for the adaptors to be declared and able to send and receive requests through the CISE Network.

More globally, each user willing to access the Legacy System through the CISE network has to be registered and granted authorization within the Node administration tool. To ease that work, a matrix was built by the French national coordinator of CISE in the framework of the preliminary study to identify the users and the shared data, and to define the access authorisations. At this stage, the data integrated into the network is public, but in the future, the use of this matrix will be necessary for a coherent and secure sharing of the data into CISE.

*Table 2 : Data matrix proposed for the preliminary study.*

STATUS\ ENTITY	French users				European users		SHOM L'océan en référence
	DDGI	EMM / PREMAR	DAM	COFGC	Italian Marine	Spain	
CONSUMER							
PROVIDER							- **Maritime and coastal database** : Wrecks - **Maritime boundaries**: maritime delimitations (limits of sovereignty and jurisdiction zones), Search and Rescue (SAR) zones, maritime Traffic Separation Schemes (TSS)
USE CASE							

With the support of the JRC, Shom was able to install its Adaptor in October 2021. Shom benefited from the full support of the JRC to ensure this work was completed during the testing phase of the pilot study.

Shom is now responsible of the Adaptor for its maintenance and update in case additional datasets in the CISE network are needed: if a new web service has to be integrated into the CISE Network, it has to be configured by Shom. Shom is also responsible of the connection to the CISE architecture but every change has to be made in cooperation with the Node's IT administrator to be registered and granted authorization.

The scheme hereafter presents the configuration and CISE Network structure that were necessary to perform the integration tests of the pilot study. The Adaptors delivered by the JRC have on one hand the role to integrate Shom's Legacy System's data into the CISE Network as provider, and on the other hand to enable the connection as data consumer and send data requests to perform the integration tests.

Figure 6: Global vision of the CISE Network from Shom's point of view.
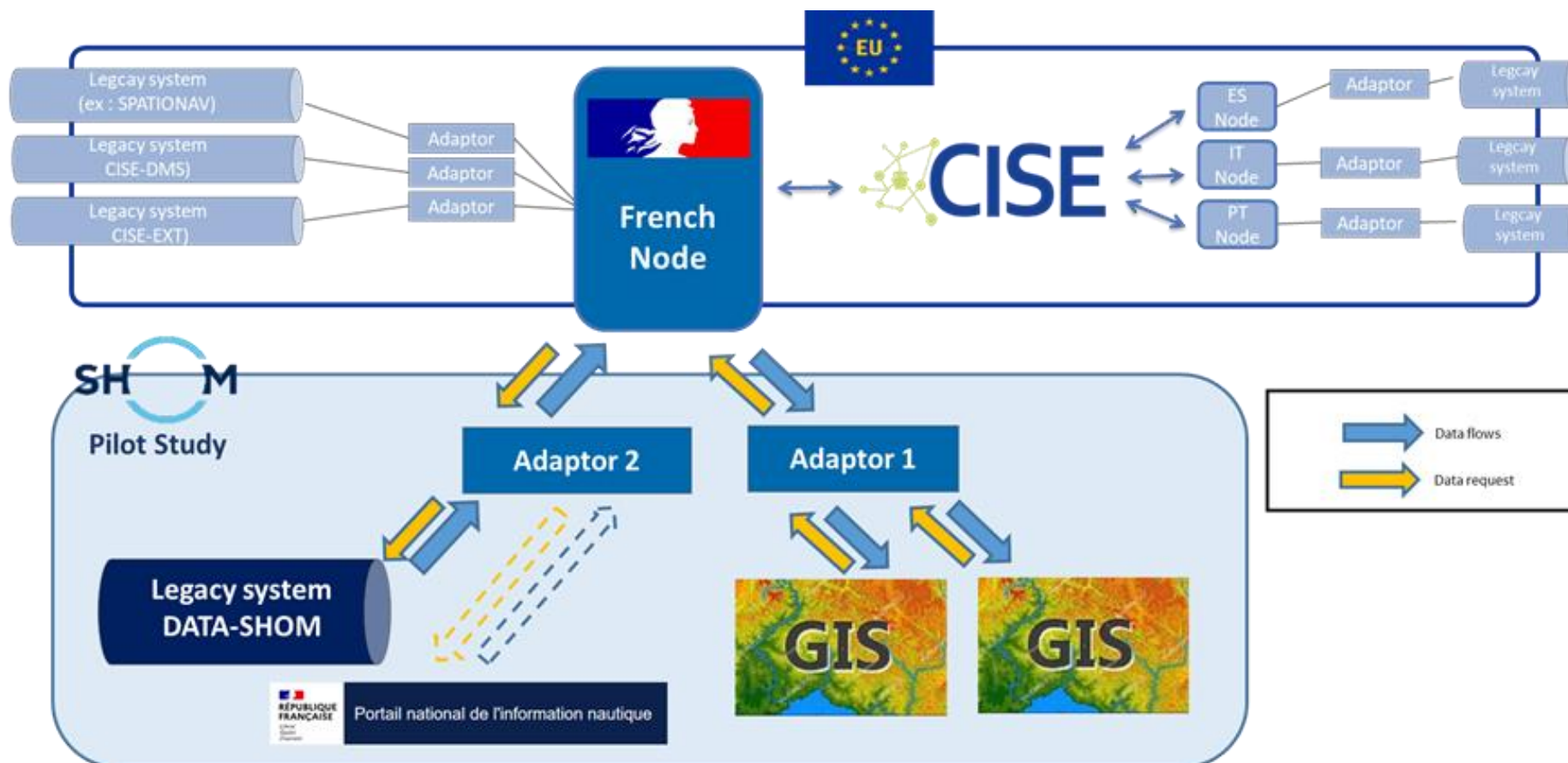
3.4. Resources

Most servers at Shom are implemented as virtual machines, which greatly eases their provisioning.

3.4.1. Technical resources

In order to set up the 2 necessary servers according to the JRC's instructions, we declared and installed:

- 2 virtual machines (VM) with the following technical specifications
    - o Operating system: Ubuntu 18.04 (LTS)
    - o Disk: 16 Gb
    - o RAM: 2 Gb
- 1 DMZ implemented as a VLAN with minimal connections to Shom's internal network

1 IPSec connection to the CISE node, in accordance with CISE's network numbering scheme

3.4.2. Human resources

The following HR profiles were required in order to implement the different components:

- 1 network and firewall administrator
- 1 systems administrator (linux)

The needs (in person-days) were roughly as follows:

Regarding the initial implementation phase:

- 2 person-days of network & firewall administrator (VLAN creation, configuration and tests, firewall rules, IPSec network configuration and tests)
- 5 person-days of systems administrator (creation, configuration and tests of the 2 virtual machines, deployment, configuration and test of the adaptors)

Regarding the investigations and tests phase:

- 1 person-day of network & firewall administrator (modification of the firewall rules, and of the IPSec configuration, tests)
- 10 person-days of systems administrator (investigation of different problems, deployment of several new adaptor versions and tests of those new versions)

In order to maintain a permanent integration of Shom datasets into the CISE Network, needs for maintenance and future upgrades to pursue the biannual node version updates could be estimated as follow:

- Simple software update (upgrade of the adaptors with a similar configuration): 2,5 person-days of systems administrator

- Major software update (adaptors set up requiring new types of configuration): 5 person-days of systems administrator
- Maintenance/ bug correction: 1 person-day of systems administrator.

4. Integration Test

4.1. Implementation test

Once the Adaptor developed, delivered to Shom and connected with Shom's server and with the French Node, the testing phase took place to check and ensure that the architecture runs properly (proof of concept step) for the French side of the CISE network. **The main attention point is the capabilities of the Node and of the Adaptors to manage the web service format of Shom's datasets to ensure their possible integration.**

The implementation tests have been a long-term process involving different development phases and a lot of cooperation with the different stakeholders mentioned in the previous section. Since the delivery of the first Adaptor version in October 2021, several configurations have been obtained thanks to the development work provided by the JRC in order to get a conclusive test situation. The integration of Shom's web services into the CISE network has revealed difficulties in managing the national Node and more generally in integrating into the global network, as the format is not natively managed. As a reminder, Shom disseminates its data through 3 web services in the WMS standard, a ncWMS flow (NetCDF data), a WMS-r flow (Raster data) and a WMS-v flow (Vector data). As a result, three configurations have been set up between October 2021 and August 2022.

The objective is to be able to consult the WMS layers using a GIS client software[10]. For the pilot study tests, the software used is the open source GIS software Qgis[11]. The consultation of a WMS layer implies the use of an URL which allows to issue a data request from the software. **Two types of requests are used**:

- the **GetCapabilities** request to find out the available data catalogue
- the **GetMap** request to load the data into the viewer of the software used.

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[10] A tutorial for the connexion procedure to a WMS layer with Qgis is available in the appendices.
[11] Internal tests have been realized with Qgis 3.16.16 "Hanno ver" and Qgis 3.26.2 "Buenos Aires"

The URL entered to consult the flow via the CISE network is the url of the data consumer Adaptor, which sends the GetCapabilities and GetMap requests through the CISE network to target the Legacy System data.shom.fr.

During this implementation and test phase, three configurations, corresponding to different versions have been set up to achieve the integration of Shom datasets in web services standards into the CISE environment.

**Figure 7: Get capabilities requests in Qgis for three WMS services from data.shom.fr**
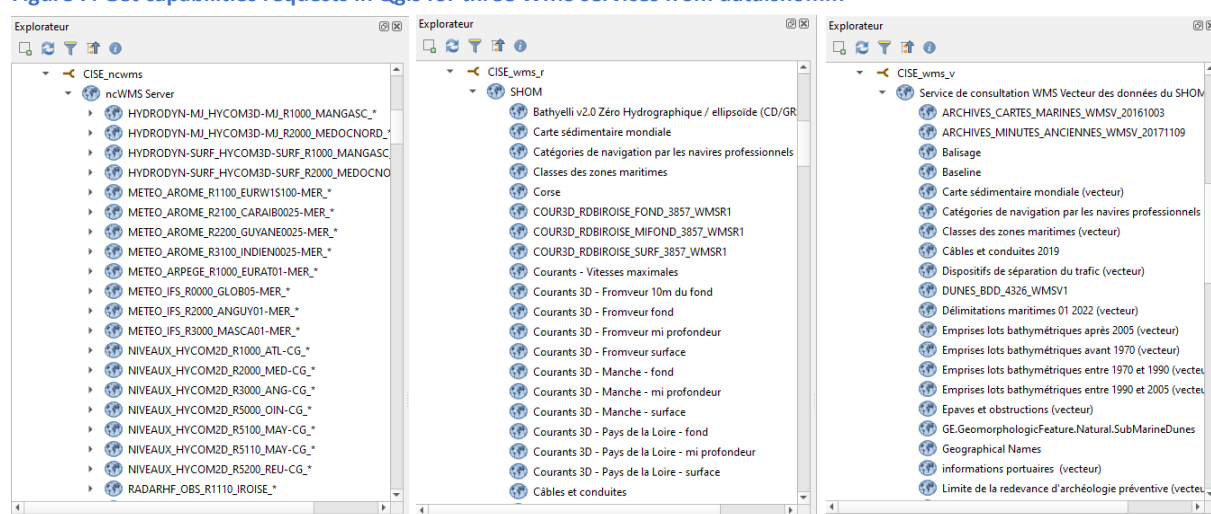
- ***Configuration 1: French Node 2.0.5 and Adaptors 2.0.5***

The Adaptor provided by the JRC was installed at Shom in March 2022 and registered to the French Node in April, on the version 2.0.5 of the Node. Attempts to connect to the data then showed the **possibility of performing a GetCapabilities and a GetMap on the ncWMS (forecast) layers**. On this version of the Node and Adaptors, **raster and vector WMS were not supported.**

In this first version, only the GetCapabilities request was going through the Node, the data was sent through a bypass, which was internally active in Shom's server between the two Adaptors (provider and consumer), as they were on the same network and could "see" each other. This configuration, hindering the consultation of data through the CISE network by an external client, had to be modified.

Figure 8: CISE Structure scheme provided by JRC presenting the bypass on port 7979 between the adaptors
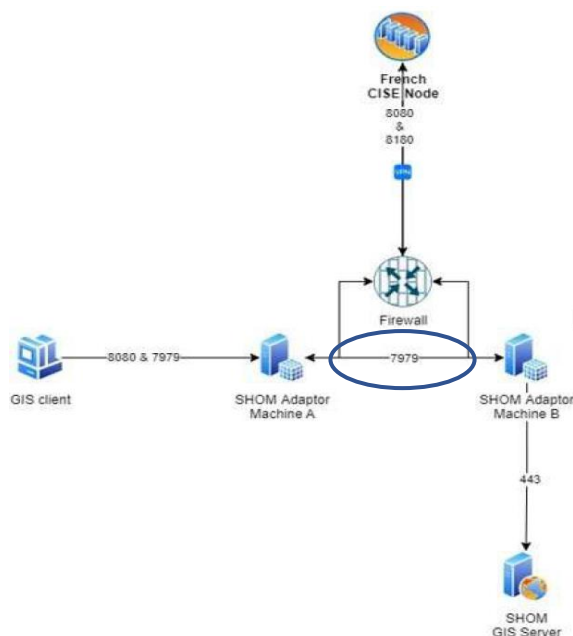
In order to have an operational configuration and for WMS-r and WMS-v data to be supported, the Node and the Adaptor had to be upgraded. Technical problems with the administration of the French node did not allow the upgrade, so EMSA provided a test Node in version 2.1 (in a similar configuration to the French Node) to allow the pilot study tests to continue.

Finally, during this first implementation phase, the need to manage each service individually and therefore to have a pair of Adaptors for each of the three Shom WMS services also emerged.

- *Configuration 2: EMSA test Node 2.1 and Adaptors 2.1*

The JRC developed a version 2.1 of the adaptor, delivered in May 2022. In parallel, the connection to the test Node provided by EMSA required the setting up of a dedicated VPN for the data provider and data consumer services. A second pair of Adaptors was then installed on the Shom's servers to maintain the ncWMS connection (upgraded in 2.1 as well) while being able to test the WMS-r and WMS-v layers.

The new implementation phase carried out in cooperation with the JRC and EMSA enabled a new test phase realized in June 2022. **This new configuration is once again operational for the consultation of**

the ncWMS flow. However, for the WMS-r and WMS-v, only the GetCapabilities request works, without the possibility of loading the data.

Figure 9: Waves direction forecast data displayed in Qgis with the ncWMS service.
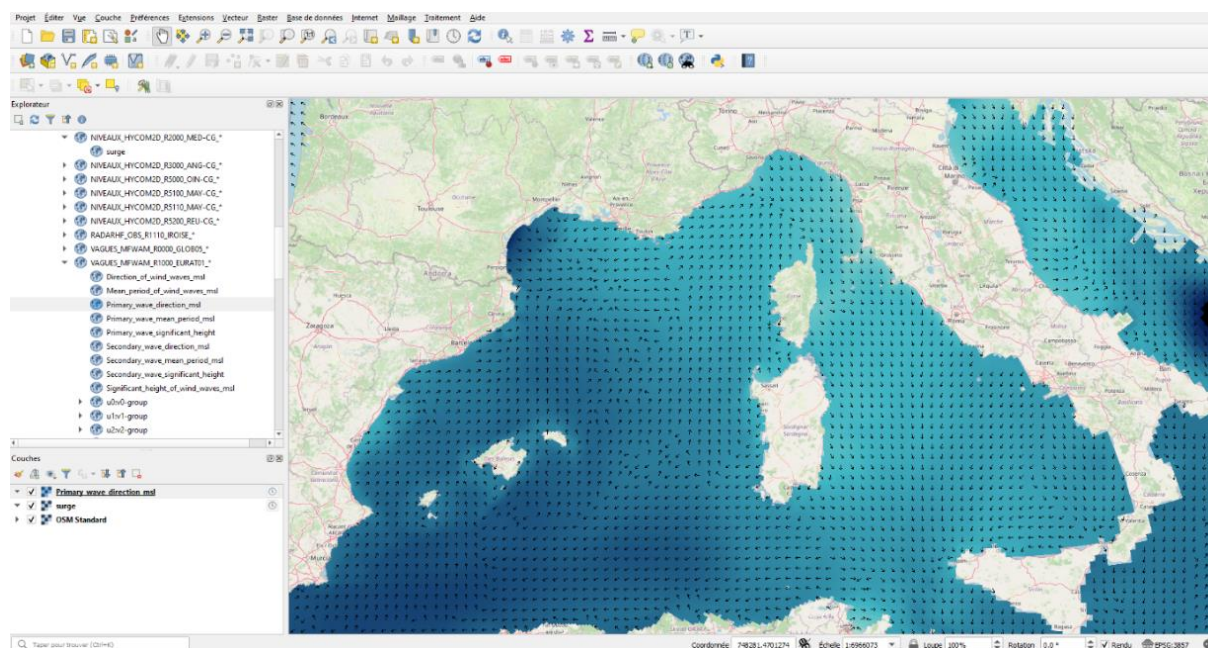
Investigations with the JRC showed that the GetMap requests were using a CSW service (metadata search service) not supported by the Adaptor. The JRC then undertook the development of a Beta version of the adaptors to overcome this issue.

- *Configuration 3: EMSA test Node 2.1 and adaptors 2.1.Beta*

The two Adaptors installed at Shom were upgraded to version 2.1.Beta in July 2022 and registered to the EMSA test Node. The tests carried out with this Beta version allowed the consultation and loading of data from the three services. A third adapter was therefore installed and registered to the Node in August 2022 in order to be able to connect all three WMS types simultaneously.

The data was loaded to test the proper functioning of the web services through CISE. **The Beta version allows a complete consultation of the data up to the possibility of loading the metadata linked (attributes, pictures, …) to the geographical vector objects (WMS-v).**

Figure 10: Bathymetry data and wrecks displayed in Qgis with the WMS-r service
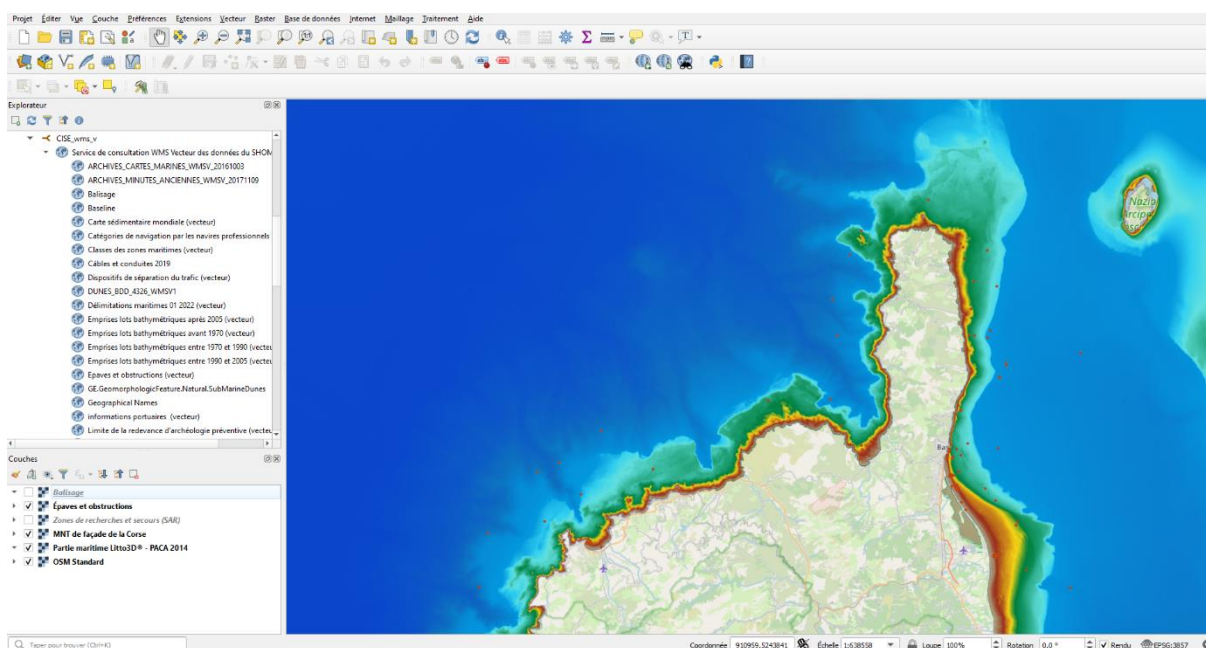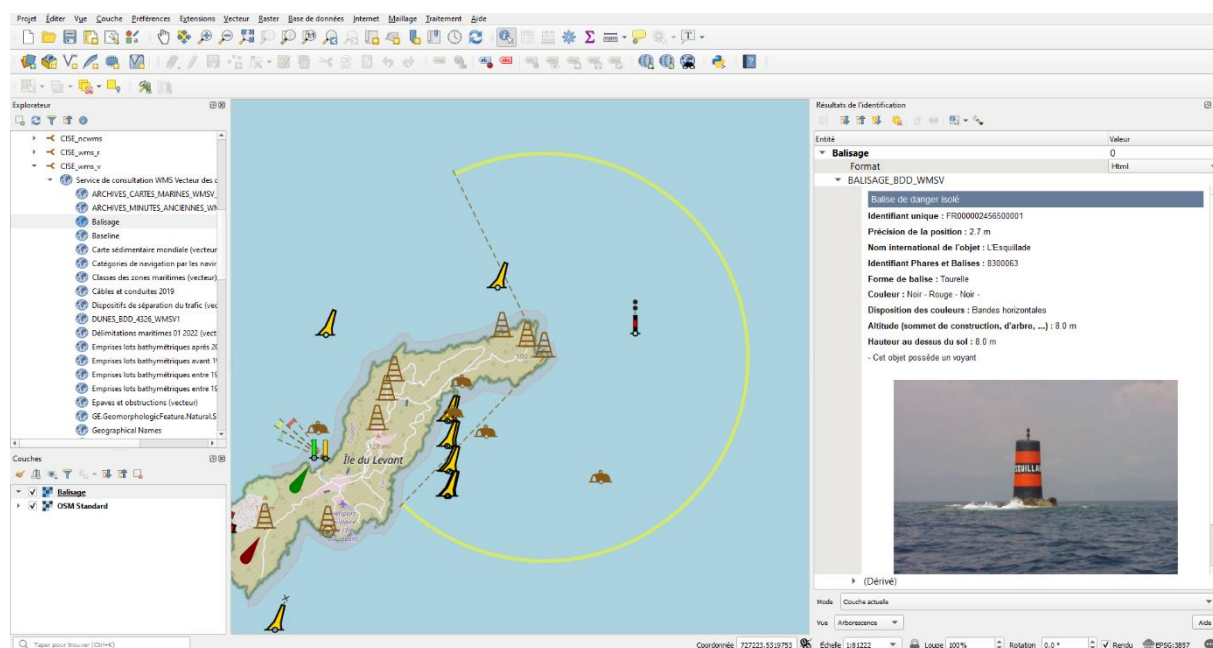

Figure 11: Getcapabilities and getmap with attributes on the beaconing layer in Qgis.

These different development stages have enabled Shom to connect its data flows to a test Node recreating the conditions of connection to the CISE network and then to enable successful internal connection tests.

4.2. User tests

Once the configuration work completed and the internal tests validated, the objective of the pilot study was to validate the integration of Shom data into the CISE Network by performing external user tests.

Initially, in order to validate the correct integration of data, connection tests were planned at three scales. The objective was to verify the possibilities of connections at the national and international (European) levels. For these three levels of testing, partners have been identified in order to carry out these tests:

- Internally, by Shom

- At national level, in partnership with DGAMPA (Coast Guard)

- At European level, in partnership with EMSA

Figure 12: Partners at national & european scale for the integration tests in the pilot study
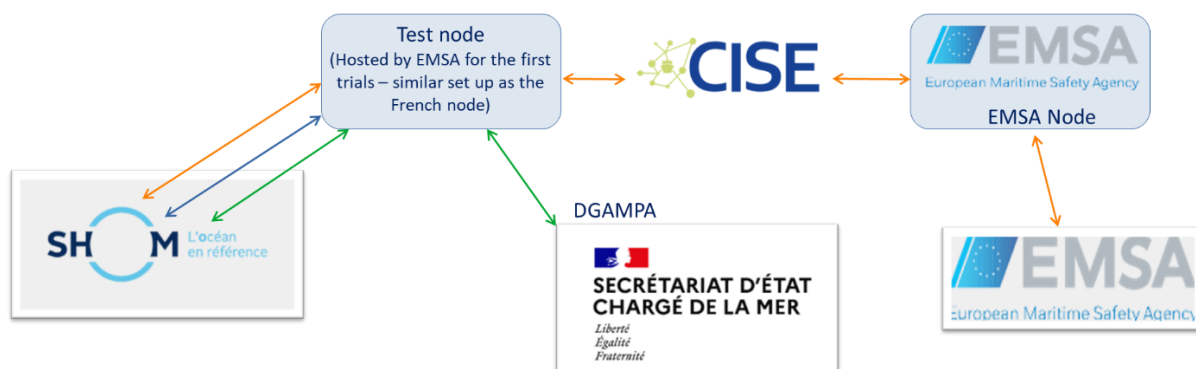
The partnership with DGAMPA had to enable some testing at national level, the connection to Shom's data through the same national Node but from another Legacy System, SeaMIS, used by the French coastguards. The partnership with EMSA is an additional step to check the possible connections through two different Nodes.

Several factors have prevented the completion of the tests planned initially (figure 10):

- The SeaMIS Legacy System is unable to handle connections to data catalogues such as those proposed by the Shom web services.
- The test Node could not be connected to the operational EMSA Node.

The tests at the European scale through two Nodes haven't been achieved either. However, tests were carried out in partnership with the JRC. The JRC was able to connect to the EMSA test Node by installing

consumer Adaptors and a direct VPN connection to this Node. Data use tests were performed during a video meeting in August 2022 (figure 11) and validated the possibility for the JRC to connect to the data.shom.fr data via the EMSA test Node, using a GIS client software[12].

Figure 13: Screenshot token during the test session performed with the JRC and EMSA.
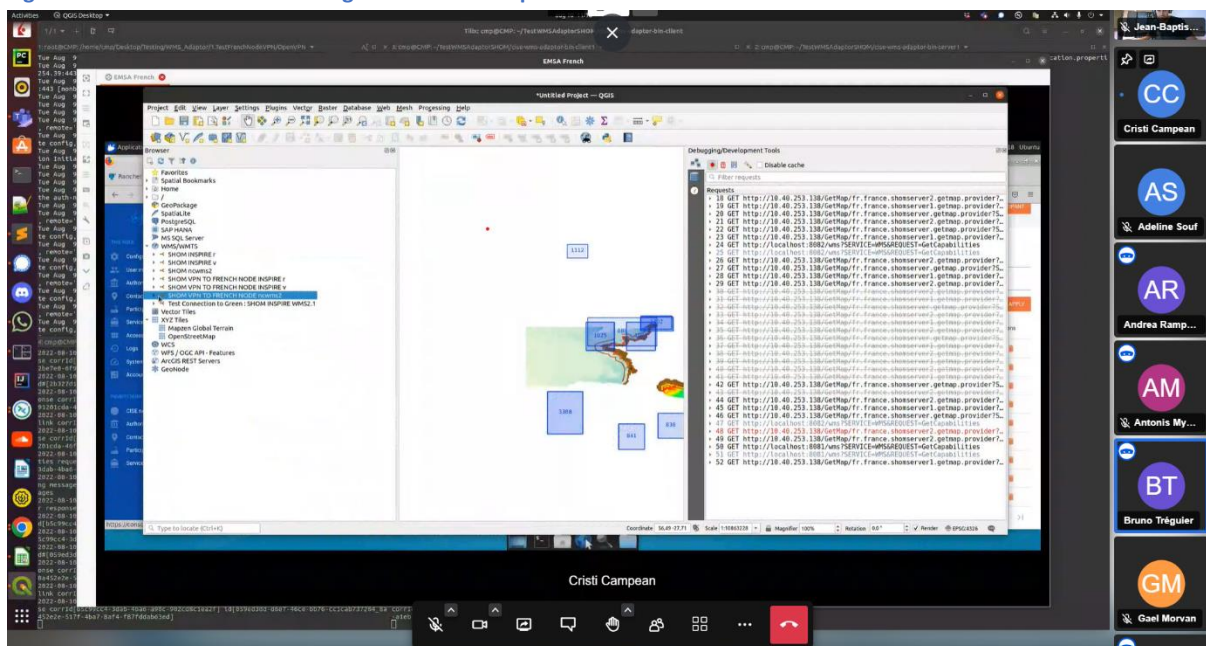
To confirm these different test phases, Shom was able to identify, on its data server side, the requests coming from the EMSA test node and thereby confirm the possibility of integration of its data within the CISE environment.

4.3. Testing results

The pilot study and the tests performed have enabled three Shom web services to be available in the CISE environment. As the EMSA test Node configuration is similar to the French Node's one, it should now be possible to transfer easily the process from one to the other.

This pilot study opens the door to the integration in CISE of a new type of data that was not managed so far. The use of web services in CISE should be useful. The WMS standard makes it possible to consult geographical data without having to download it. Data is provided from a GIS server under the responsibility of the data producer. This gives users access to the latest data available, without risks of using or downloading outdated data.

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[12] Qgis 3.26.2 « Buenos Aires » version has been used by the JRC for the tests.

The infrastructure used for these tests is shown in the diagram below. The use of a pair of adaptors for each type of web service is involved. The test Node provided by EMSA is now managed by the JRC (IT Node administrator of the test Node) and will be available until the end of 2022 in order to be able to keep tests going and consider new work paths until the French node is available again.

Figure 14: Final network configuration for the test performed in the pilot study.
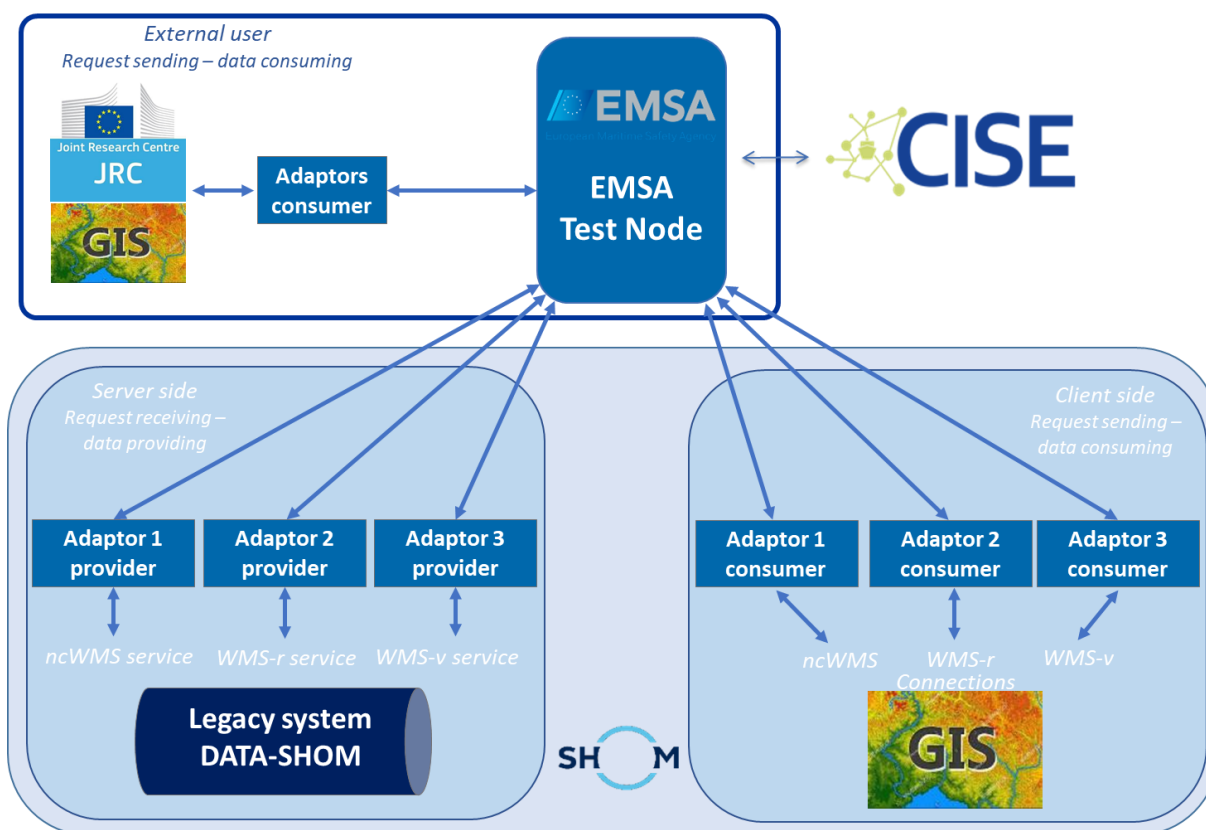
Some limitations were encountered while carrying the tests during the pilot study. The French Node is not managed by Shom and therefore connecting one or more Adaptor(s) requires a technical back-office support at the Node level. Also, the SeaMIS Legacy System, which should eventually be one of the main users of Shom's data via CISE, does not seem to support the connection to Shom's data for the moment.

For the purpose of these tests, Shom was acting both as provider and client, but should remain a provider only in the future.

These tests validated the possibility of sharing geographical data through web services into CISE, which constitutes new perspectives in the use of this network, by having a more comprehensive understanding of the environment to adapt one's actions at sea. However, this innovative use still implies certain limitations on the user's side and requires further development efforts.

5. Limits and perspectives

Through this pilot study, Shom is a forerunner in the use and integration of web services into the CISE Network. On the client side, the use of these web services may still involve some challenges.

The Adaptors, developed for the needs of the pilot study and adapted to Shom's data sharing format (using web services), are for the moment not compatible with the data already processed within the CISE network. Moreover, it is currently necessary to have one Adaptor per service, also on the client side. The configuration of these Adaptors and the implementation of a secure connection to the national Node require dedicated hardware and resources to catch up with the successive upgrades of the CISE versions. Shom was able to conduct this pilot study thanks to the support of its in-house IT department, which carried out the work on its internal architecture and ensured the technical dialog with the Node's administrator, the JRC and EMSA.

Three different services are available at the moment. The addition of a service allowing the sending of navigational warnings via PING can be considered. Also, a specific service, with restricted access (requiring a subscription) for nautical charts is to be added. And finally, Hydrographic Offices are not the only players dealing with WMS standards, any other WMS data providers (such as marine habitats, pollution…) could use this type of adaptor and provide their data through the CISE network.

The development of new tools can be considered to improve the integration of WMS. The JRC and Shom have begun thinking about the creation of a "multiplexer" that should make it possible to support several services, or even several types of data, through a single Adaptor.

Server-side identification of requests from the CISE Node can also help quantify the most used data and provide more consistent services across the network. A matrix will have to be set up for the management of users and clients at the Node level. This will allow access to restricted data (e.g. nautical charts) to be limited to certain users of the network. In fact, each user must be declared at the Node level, which makes it possible to filter the services made available to the various potential clients.

However, the usefulness of the Adaptor produced to share web services, all those development possibilities and use perspectives of CISE depend on the number of potential clients (and providers) from the different member states. In a way to implies new partners, it has to be noted that the Adaptor which was developed by the JRC will eventually become open-source and be used by all potential users.

Reciprocally, these new services have to be promoted in order to make the potential users aware of their availability. In that way, the CISE services catalogue has to be updated and presented in more readable way. More generally, a feedback from the potential users of the CISE network on these web services and on their presentation should be sought in order to check and improve their usefulness. All these aspects were out of the scope of this study.

Conclusion

The objective of the MED OSMoSIS study on CISE for France was to evaluate the integration of Shom's data into the CISE network. This study enabled to particularly focus on the implementation of the French Node and on user tests.

The extension of the MED OSMoSIS project was an opportunity for the Shom to carry out a conclusive pilot study. The integration of a data format not then supported in CISE led the Shom, the JRC and EMSA to set up a new structure and dedicated tools. These tools open up the consultation of geographical data through the use of web services in the CISE network and lead to new avenues of work for the operational integration of the network, which can now be envisaged in the framework of the next project dedicated to CISE (EMFAF CISE-ALERT project).

The main key points needed to ensure the possibilities to integrate and share data in a web service format through CISE have been shown: (i) Important set up work on the IT structure to install and connect the Adaptors and (ii) active management at the Node for the registration and authorisation of the users.

The study on the integration of Shom's data into CISE highlighted that strong technical and temporal coordination is required on behalf of the different stakeholders. It also showed how essential the use of similar Node versions by both data providers and end users is for data exchange to be possible. The demonstration has been made on the 2.1 version of the node, which will be upgraded on a yearly basis.

These tests enabled Shom to participate to the development effort led for the benefit of the whole CISE network and community. The integration of the French Hydrographic Office's datasets will hopefully strongly contribute to future data sharing across the network and therefore strengthen further the European cooperation already growing in the maritime surveillance and safety fields. The CISE network is bound to become a major tool for all maritime surveillance stakeholders to share information with their counterparts at a Mediterranean and European level, improve awareness and promote their respective activities.

Appendices

Appendix 1: Shom's WMS datasets table

	wms/r	wms/v	ncwms
Cartography			
Nautical charts (RasterMarine)	RASTER_MARINE_3857_WMSR	x	x
Coastal charts (Scan Littoral®)	SCAN-LITTO_PYR-PNG_WLD_3857_WMSR	x	x
Maritime boundaries			
Categories of navigation by professional vessels	DAM_LIMIT_CAT_NAVIGATION_WMSR	DAM_LIMIT_CAT_NAVIGATION_WMSV	x
Classes of maritime areas	DAM_CLASS_ZONES_MAR_WMSR	DAM_CLASS_ZONES_MAR_WMSV	x
Maritime boundaries	DELMAR_PYR-PNG_WLD_3857_WMSR	DELMAR_BDD_WMSV	x
Separation trafic schemes	DST_PYR_PNG_3857_WMSR	DST_BDD_WMSV	x
Salt water limits	LIMITES_SALURE_EAUX_WMSR	LIMITES_SALURE_EAUX_WMSV	x
Maritime Administration Boundaries	LIMITE_INSCRIPTION_MARITIME_WMSR	LIMITE_INSCRIPTION_MARITIME_WMSV	x
Transverse sea boundaries	LIMITES_TRANSVERSALES_MER_WMSR	LIMITES_TRANSVERSALES_MER_WMSV	x
Limits on fishing uses	x	LIMITES_PECHE_BDD_WMSV	x
Limit of the preventive archaeology fee	x	RAP_BDD_WMSV	x
Search and Rescue Areas	SAR_PYR_PNG_3857_WMSR	x	x
Land-Sea Limit	x	LIMTM_3857_WMSV	x
Coastline DOM-COM	TCH-LINE_PYR-PNG_WLD_3857_WMSR	TCH-LINE_BDD_WLD_WGS84G_WMS	x
High resolution coastline	TCHR_3857_WMSR	TCHR_3857_WMSV	x

French Sub-Antarctic Islands			x
Maritime and coastal database			
Beaconing	x	*BALISAGE_BDD_WMSV*	x
Cables and pipes	*CABLES_PYR-PNG_WLD_3857_WMSR*	*CABLES_BDD_WLD_WGS84G_WMS*	x
Wrecks and obstructions	*EPAVES_PYR-PNG_WLD_3857_WMSR*	*EPAVES_BDD_WLD_WGS84G_WMS*	x
Harbour information	*INFORMATIONS_PORTUAIRES_PYR_PNG_3857_WMSR*	*INFORMATIONS_PORTUAIRES_BDD_WMSV*	x
Regulations - navigation	*REGLEMENTATION_NAVIGATION_PYR_PNG_3857_WMSR*	*REGLEMENTATION_NAVIGATION_BDD_WMSV*	x
Marine toponymy	*TOPONYMIE_PYR_PNG_3857_WMSR*	*TOPO_BDD_FXX_WGS84G_WMS*	x
Coastal altimetry			
Litto3D®			
Saint-Barthélemy v2	*LITTO3D_STBARTHELEMY_2019_PYR_3857_WMSR*	x	x
Saint-Martin v2	*LITTO3D_STMARTIN_2019_PYR_3857_WMSR*	x	x
Guadeloupe	*LITTO3D_GUAD_2016_PYR_3857_WMSR*	x	x
Martinique	*LITTO3D_MART_2016_PYR_3857_WMSR*	x	x
Finistère	*LITTO3D_FINISTR_2014_PYR_3857_WMSR*	x	x
Languedoc-Roussillon	*LITTO3D_LR_2009_PYR_3857_WMSR*	x	x
Provence-Alpes-Côte d'Azur	*LITTO3D_PACA_2015_PYR_3857_WMSR*	x	x
Eparses	*LITTO3D_EPARSES_2012_PYR_3857_WMSR*	x	x
Mayotte	*LITTO3D_MAYOT_2012_PYR_3857_WMSR*	x	x
Réunion	*LITTO3D_REUNION_2016_PYR_3857_WMSR*	x	x
Litto3D® Partie maritime			
Normandie et Hauts-De-France	*L3D_MAR_NHDF_2016_2018_PYR_3857_WMSR*	x	x

Bretagne	*L3D_MAR_BZH_2018_2021_WMSR_3857*	x	x
Finistère	*L3D_MAR_FINISTR_2014_PYR_3857_WMSR*	x	x
Parc Naturel Marin d'Iroise	*L3D_MAR_PNMI_2012_PYR_3857_WMSR*	x	x
Morbihan	*L3D_MAR_MORBIHAN_2015_PYR_3857_WMSR*	x	x
Languedoc-Roussillon 2014-2015	*L3D_MAR_LR_2014_2015_WMSR_3857*	x	x
Languedoc-Roussillon 2011	*L3D_MAR_LR_2011_PYR_3857_WMSR*	x	x
Provence-Alpes-Côte d'Azur	*L3D_MAR_PACA_2014_PYR_3857_WMSR*	x	x
Corse	*L3D_LIDAR_CORSE_2017_2018_PYR_3857_WMSR*	x	x
Other lidar products			
Rance	*L3D_LIDAR_RANCE_2019_WMSR_3857*	x	x
Polynésie Française - Bora Bora	*L3D_LIDAR_POLYNESIE_BOR_2015_WMSR_3857*	x	x
Polynésie Française - Moorea	*L3D_LIDAR_POLYNESIE_MOO_2015_WMSR_3857*	x	x
Polynésie Française - Taharuu	*L3D_LIDAR_POLYNESIE_TAHARUU_2015_WMSR_3857*	x	x
Polynésie Française - Tahiti	*L3D_LIDAR_POLYNESIE_TAHITI_2015_WMSR_3857*	x	x
Bathymetry			
Bathymetric measures			
After 2005	x	*LOTS_BATHY_APRES_2005_WMSV*	x
Between 1990 and 2005	x	*LOTS_BATHY_1990_2005_WMSV*	x
Between 1970 and 1990	x	*LOTS_BATHY_1970_1990_WMSV*	x
Before 1970	x	*LOTS_BATHY_AVANT_1970_WMSV*	x

Bathymetric DTM			
Clipperton	MNT_FACADE_CLIPPERTON_3857_WMSR	x	x
Saint-Martin et Saint-Barthélemy	MNT_ANTN100m_HOMONIM_PBMA_4326_WMSR	x	x
Guadeloupe et Martinique	MNT_ANTS100m_HOMONIM_4326_WMSR	x	x
Guyane	MNT_GUY100m_HOMONIM_PBMA_3857_WMSR	x	x
Atlantique	MNT_ATL100m_HOMONIM_PBMA_3857_WMSR	x	x
Golfe du Lion - Côte d'Azur	MNT_MED100m_GDL_CA_HOMONIM_PBMA_3857_WMSR	x	x
Corse	MNT_MED100m_CORSE_HOMONIM_PBMA_3857_WMSR	x	x
Mayotte	MNT_MAY100m_HOMONIM_PBMA_PYR_PNG_3857_WMSR	x	x
Réunion	MNT_REU100m_HOMONIM_PBMA_PYR_PNG_3857_WMSR	x	x
Nouvelle-Calédonie	MNT_NC100m_PBMA_4326_WMSR	x	x
Topo-bathymetric DTM			
Détroit du Pas-de-Calais	MNT_COTIER_DETROIT_PDC_20m_PBMA_WMSR_3857	x	x
Port de Boulogne-sur-Mer	MNT_COTIER_PORT_BSM_TANDEM_10m_PBMA_3857_WMSR	x	x
Port de Saint-Malo et ses abords	MNT_COTIER_PORT_SM_PAPI_SM_5m_PBMA_4326_WMSR	x	x

Golfe normand-breton	MNT_COTIER_GNB_PAPI_SM_20m_PBMA_4326_WMSR	x	x
Morbihan	MNT_COTIER_MORBIHAN_TANDEM_20m_PBMA_3857_WMSR	x	x
Pertuis Charentais	MNT_COTIER_PERTUIS_HOMONIM_20m_PBMA_3857_WMSR	x	x
Estuaire de la Gironde Amont	MNT_COTIER_GIRONDE_AMONT_20m_PBMA_3857_WMSR	x	x
Estuaire de la Gironde Aval	MNT_COTIER_GIRONDE_AVAL_20m_PBMA_3857_WMSR	x	x
Saint-Jean-de-Luz	MNT_COTIER_BAIE_SJL_TANDEM_20m_3857_WMSR	x	x
Clipperton	MNT_COTIER_CLIPPERTON_3857_WMSR	x	x
Vertical References			
Maritime Altimetric References	x	RAM_BDD_WLD_WGS84G_WMS	x
Surface BATHYELLI Hydrographic zero / ellipsoid (CD/GRS80)	BATHYELLI_ZH_PYR_PNG_3857_WMSR	x	x
Sedimentology			
Global sediment map	SEDIM_MONDIALE_PYR_PNG_3857_WMSR	SEDIM_MONDIALE_BDD_4326_WMSV	x
Nature of the seabed metropolitan France (50 000)	NDF_PYR-PNG_WLD_3857_WMSR	NDF_BDD_WLD_WGS84G_WMS	x
Nature of the seabed scale 150 000	NATURES_FOND_150_PYR_PNG_3857_WMSR	NATURES_FOND_150_BDD_4326_WMSV	x
Nature of the seabed scale 500 000	NATURES_FOND_500_PYR_PNG_3857_WMSR	NATURES_FOND_500_BDD_WMSV	x

Distribution of dunes on the French continental platform	DUNES_PYR_PNG_3857_WMSR	DUNES_BDD_4326_WMSV	x
Geophysics			
Gravimetric stations	x	STATIONS_GRAVI_WMSV	x
Tide			
Tidal range coefficient 20	MARNAGE_INF_3857_WMSR	MARNAGE_INF_BDD_4326_WMSV	x
Tidal range coefficient 45	MARNAGE_ME_3857_WMSR	MARNAGE_ME_WMSV	x
Tidal range coefficient 90	MARNAGE_VE_3857_WMSR	MARNAGE_VE_WMSV	x
Tidal range coefficient 120	MARNAGE_SUP_3857_WMSR	MARNAGE_SUP_BDD_4326_WMSV	x
Types of tides	TYPE_MAREE_PYR_PNG_3857_WMSR	TYPE_MAREE_BDD_4326_WMSV	x
Tidal areas	ZONES_MAREE_PYR_PNG_3857_WMSR	ZONES_MAREE_BDD_4326_WMSV	x
Tidal currents 2D			
neap tide +- 6h PM	COURANTS2D_WMSR_ME*_3857	x	x
spring tide +- 6h PM	COURANTS2D_WMSR_VE*_3857	x	x
Maximum Speeds	COURANTS2D_WMSR_VMAX_3857	x	x
Currrents 3D			
Manche	COURANTS_3D_MANCHE_*_WMSR_3857	x	x
Fromveur	COURANTS_3D_FROMVEUR_*_WMSR_3857	x	x
Rade de Brest Iroise	COUR3D_RDBIROISE_*_3857_WMSR	x	x
Pays de la Loire	COURANTS_3D_LOIRE_*_WMSR_3857	x	x
Historical data			
Ancient nautical charts	x	ARCHIVES_CARTES_MARINES_WMSV	x
Ancient hydrographic minutes	x	ARCHIVES_MINUTES_ANCIENNES_WMSV	x
Coastal observations			
Turbidity time series ROEC	x	ROEC_TURBI_3857_WMSV	x
Oceanographic forecasts			

Waves WW3	x	x	VAGUES_WW3_R*
Waves MFWAM	x	x	VAGUES_MFWAM_R*
Water levels	x	x	NIVEAUX_HYCOM2D_R*
Hourly surface hydrodynamics	x	x	HYDRODYN-SURF_HYCOM3D-SURF_R*
Daily average 3D hydrodynamics	x	x	HYDRODYN-MJ_HYCOM3D-MJ_R*
Weather	x	x	METEO_*

Appendix 2: External meeting synthesis table

ID	Date (YYMMDD)	Organisation	Topic	Meeting language
1	200214	JRC et Shom	The objective was to learn about the technical modalities of integrating the Shom data into the CISE network.	FR
2	200310	JRC et Shom	Presentation of the adaptor provided by JRC	FR
3	200909	COFGC et Shom	Identification of the user need for Shom data for use via CISE	FR
4	200928	EMM et Shom	Study for the integration of Shom data into CISE/Questions from Shom concerning the links between Shom's CISE adapter and the French node hosted by DIRISI	FR
5	201202	SGMER et Shom	Update on Shom activities in OSMoSIS, focus on CISE	FR
6	201208	SGMER,COFGC, DGDDI, DAM, DGA, EMM et Shom	CISE WG The objective was to make an official assessment of the situation of CISE with the administrations and actors concerned or interested, to better understand their expectations or difficulties, and to establish the basis for future actions, particularly in terms of governance and the pursuit of the development of CISE in France.	FR
7	210122	TELESPAZIO et Shom	Exchange on TELESPAZIO feedback for the connection of CISE-Data Mining Services to the CISE-FR node	FR
8	210201	JRC et Shom	establishing a CISE calendar	FR
9	210312	SGMER, JRC, DGA, EMM et Shom	Exchange on Shom data integration tests	FR
10	210325	SGMER,COFGC, DAM, DGA, EMM et Shom	(CISE WG) The objective was to make an official assessment of the situation of CISE with the administrations and actors concerned or interested, to better identify their expectations or difficulties, and to draw up the basis for future actions, particularly in terms of governance.	FR
11	210505	JRC et Shom	Technical issues concerning the hosting of the adapter between JRC and Shom.	FR
12	210512	JRC et Shom	CISE adaptor demonstration	FR
13	210520	EMM et Shom	IPSEC link configuration between CISE French node and Shom adaptor	FR
14	210616	EMSA organisator, actors involved in CISE network (+30)	The "Introduction to CISE Training", participants will receive an introduction to the CISE network, they will learn about possible governance models that can be employed, about the CISE technical set-up required, the operational and administrative aspects involved and about the financial implications.	EN

15	210630	JRC, EMSA et Shom	Present the progress of the adapter and respond to the technical needs of the Shom and the JRC	FR
16	210701	SGMER et Shom	CISE progress report and calendar	FR
17	210713	JRC, EMSA et Shom	Specify the technical elements concerning the installation of the adapter and prepare the roadmap.	FR
18	210921	SGMer et Shom	SGMer visit to Shom, opportunity to present progress and obstacles encountered for CISE	FR
19	211008	JRC-EMSA-Sgmer et Shom	Specify the technical elements concerning the installation of the adapter (the disponibility of Shom to install the adapter).	FR
20	211008	SGmer- Garde cotes Finlandais et Shom	Present Shom's participation in CISE and then present the integration of Finnish data into CISE.	FR
21	211213	DIRISI et Shom	Authorisations and credentials to connect the Shom CISE adapter to the French CISE node.	FR
22	211217	SGMER,COFGC, DAM, DGA, EMM et Shom	This meeting had two objectives: - To report on the period that has passed since the last CISE WG (08/12/2020) - To present the CISE experiment that will be conducted in 2022 and to define its objectives and modalities.	FR
23	220223	SGMER, DGAMPA, Shom	Presentation of the tests planned to evaluate the integration of Shom data in CISE to DGAMPA (partner at national level for the tests) Questioning the possibility of consulting WMS flows via the DGAMPA adapter Discussion about the possibility of integrating PING wms flows into CISE tests	FR
24	220325	JRC et Shom	The objective of the meeting was to present the technical requirements for testing the connection to CISE. At the end of the meeting, it was agreed that the first tests would be carried out jointly so that the JRC could present the procedure to be followed (setting up the adapters, creating the request on the GIS client and connecting to the flow).	EN
25	220328	JRC et Shom	Demonstration for Shom in 2 steps : 1) connection from a GIS client in Shom's premises 2) connection from a GIS client outside Shom's premises (Alessandro)	EN
26	220330	ATHANOR et Shom	Connection test with French node administrator which allowed to solve the connection problems that occurred at the FR node (administered by DIRISI/Athanor) and to set up the adaptors' identifiers. Connection through the node operated but only allowed the ncWMS to be loaded.	FR

27	220404	JRC et Shom	Tests with JRC and Shom to try to solve the problem of access to WMS streams. The conclusion of these tests is that access to the WMS is also possible with the supplied adaptor, but it only allows to point to one type of stream at a time. The JRC has announced that it is working internally to find a solution to this problem: whether one adaptor is needed per stream or whether it would be possible to access different streams with the same adaptor.	EN
28	220504	DGAMPA, Naval Group et Shom	Discussions on the possibilities for DGAMPA to be the partner in the tests carried out at national level to evaluate the integration of Shom data in CISE. Naval Group, developer of the DGAMPA adapter in EFFECTOR, confirmed that it does not allow the transfer of WMS Naval Group and DGAMPA have to evaluate the possibilities to consult Shom data format to perform the tests. The problem of the end of the Naval Group/DGAMPA collaboration at the end of EFFECTOR for CISE was raised, as well as that of the transition to version 2.1. Naval Group asked Shom to provide an technical guide explaining how the tests were carried out (connection to the Shom data flows via the CISE environment).	FR
29	220511	SGMer, Athanor, Shom	Update on the situation of the French node. At the time of the meeting, the node had fallen down due to a defective HDD. The SGMer indicated that it was not possible to change it at the moment. The return to normal on the node side and the transition to V2.1 is not possible before September. A solution has been found for the EFFECTOR French Trial, which is not permanent.	FR
30	220518	JRC, EMSA et Shom	Presentation of the new adapter by the JRC and discussion following the VIP Days effector about the possibility of carrying out the tests by connecting to a test node provided by EMSA	EN
31	220531	JRC, EMSA et Shom	Technical discussion between Shom, EMSA and JRC on how to connect to the test node.	EN
32	220601	DGAMPA, Naval Group, CROSS La Garde et Shom	The initial objective was to plan the tests with DGAMPA and CROSS LaGarde with the support of Naval Group. Discussion around the possibility of connecting SeaMIS to the CISE test node provided by EMSA. Requirements for the test noted is the possibility of integration of a WMS in SeaMIS. Discussions on how Shom can support Naval Group and DGAMPA to install an adapter. Need is raised to set up a VPN to the node, to be carried out between Naval Group and EMSA	FR
33	220609	EMSA, Shom	Technical meeting between Shom and EMSA to install the VPN and connect Shom adaptors to the test node provided by EMSA.	EN

34	220614	JRC, EMSA et Shom	Technical meeting between Shom, EMSA and JRC to finalise the installation of the adapters in version 2.1 at Shom, Registration of the services at the node by EMSA and test of connection to the services with Qgis. Test on adapter 1: Get capabilities and Get map for the ncWMS stream. For the WMS-r flow, problem of loading layers linked to the CSW service (metadata links) not tolerated by the node.)	EN
35	220708	JRC, EMSA et Shom	Technical discussion between Shom, EMSA and JRC on wms display problems on the test node.	FR
36	220720	JRC et Shom	Configuration of the new adaptor (beta version) provided by the JRC. Once the configuration was completed, access to the 3 streams (ncWMS, WMS-r WMS-v) of the Shom via the test node provided by EMSA, was tested and validated. For the moment, only 2 ports are configured, only 2 services available at the same time.	EN
37	220810	JRC et Shom	Following the previous meeting 1 new adaptor for the 3rd shom web service, validation of the 3 adaptors for the 3 streams. Test of the access to the 3 streams by the JRC client validated. The tests for the CISE project are considered to be finalised.	EN

TECHNICAL GUIDE:

Accessing data from data.shom.fr via client software within the CISE environment.

How the Shom connection to the CISE environment works

CISE is a 2009 European initiative to set up a decentralised data exchange system on maritime surveillance involving different civil and military authorities of EU member states with data on this topic.

> ➢ In the framework of the MED-OSMoSIS project, the Shom is conducting a technical and financial feasibility study on the integration of its data in the CISE environment. The objective is to use the secure CISE environment to access Shom data rather than the public access portal.

In order to be able to connect to the French node, Shom is accompanied by the JRC (Joint Research Center of the European Commission) in charge of technical assistance for the operational implementation of CISE under the coordination of the EMSA (European Maritime Safety Agency). The JRC is developing a specific adaptor for sharing geographical data in the form of streams or web services, a format that Shom provides as part of its activities as a reference data provider.

Operationally, this adapter is available in two versions :

- *The adaptor 1*, which allows the integration of Shom data into CISE to be tested by sending requests to the node from a GIS software. It's the "consumer" adaptor.
- *the adaptor 2*, which connects the legacy system, data.shom.fr, to the French node and enables the integration of Shom data into CISE. It's the "provider" adaptor.

The following figure shows the current structure of the CISE Network as seen from the Shom.

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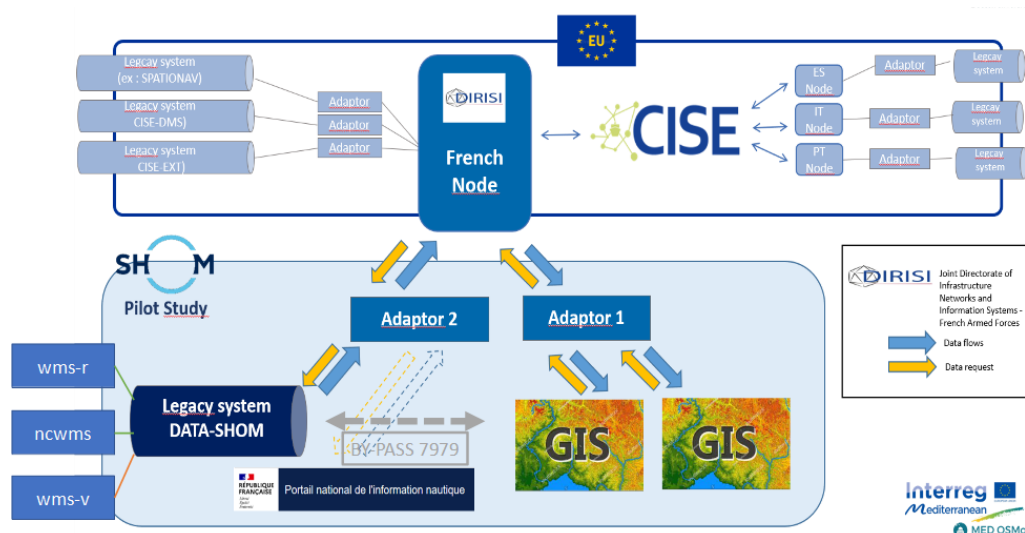
Figure 1: Scheme of the connection of Shom's legacy system to the French node

The scheduled tests should take place in 3 phases:

- Internally, via the adapter hosted at Shom
- At national level, via the DGAMPA legacy system SeaMIS
- At the European level, via the EMSA node (through several nodes)

Constraint:
The adapter must support the Shom data dissemination format: WMS raster, WMS vector and ncWMS web services.
The current version of the node and the adapters developed for the Shom, currently in version 2.0.5, only allow the ncWMS format to be broadcast. The upgrade to version 2.1 should allow the integration of all the WMS format.

The « Legacy System » *data.shom.fr* :

➢ Reference data portal for consultation in free access
➢ Data format in webservices, WMS/WFS flow (connection url in the metadata sheet linked to the data)

Data visualization on the data.shom.fr portal:

Figure 2: The data.shom.fr portal and viewable layers
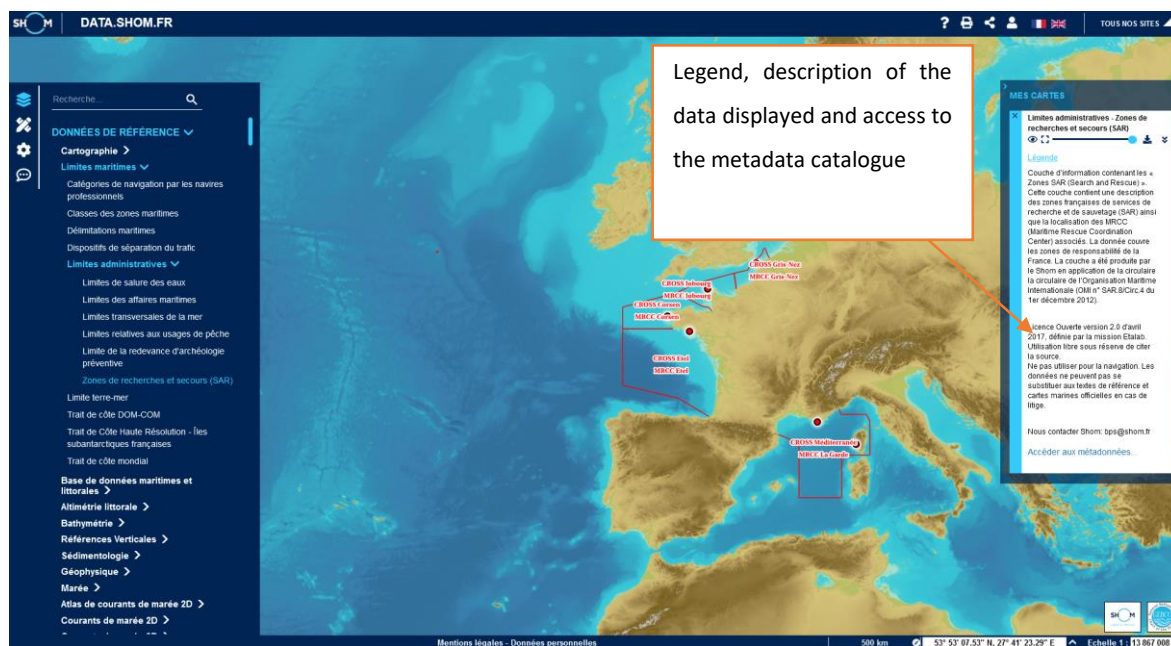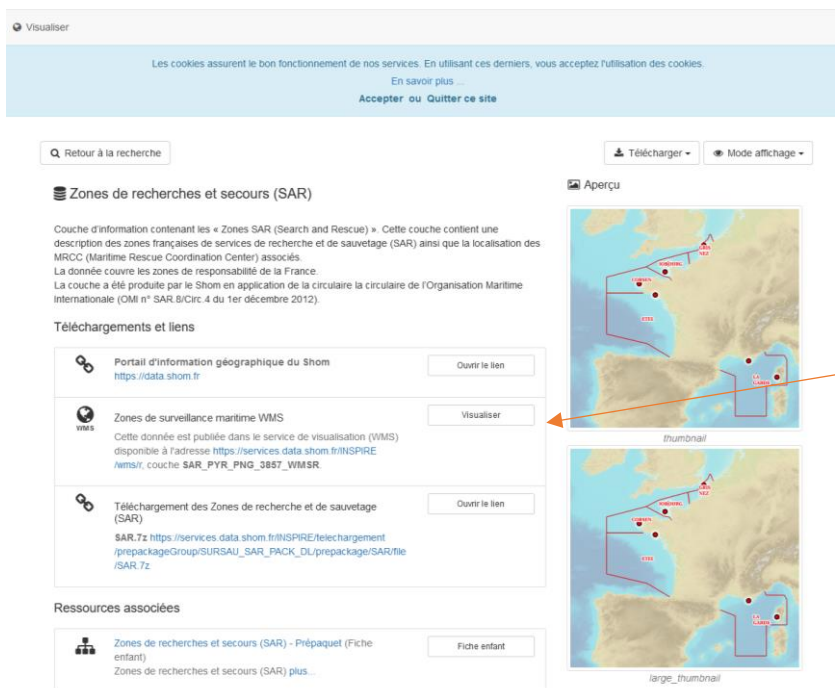
Figure 3: The information provided by the data.shom.fr portal

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The metadata catalogue : Access to the web service

Access to the connection URLs of the public web services of data.shom.fr (https://services.data.shom.fr/INSPIRE/wms/r)

Figure 4: The metadata provided on data.shom.fr

- ➢ To integrate these data into CISE, the adapter 2 ("provider") consumes Shom data server by pointing on the web services .
- ➢ Loading the data via the secure environment implies a connection from a different URL pointing to the adapter and not directly to Shom web services

Connection from a GIS client software, the example of Qgis :

- ➢ The connection is made, from a GIS software, by entering the URL of its "consumer" adaptor linked to the node .
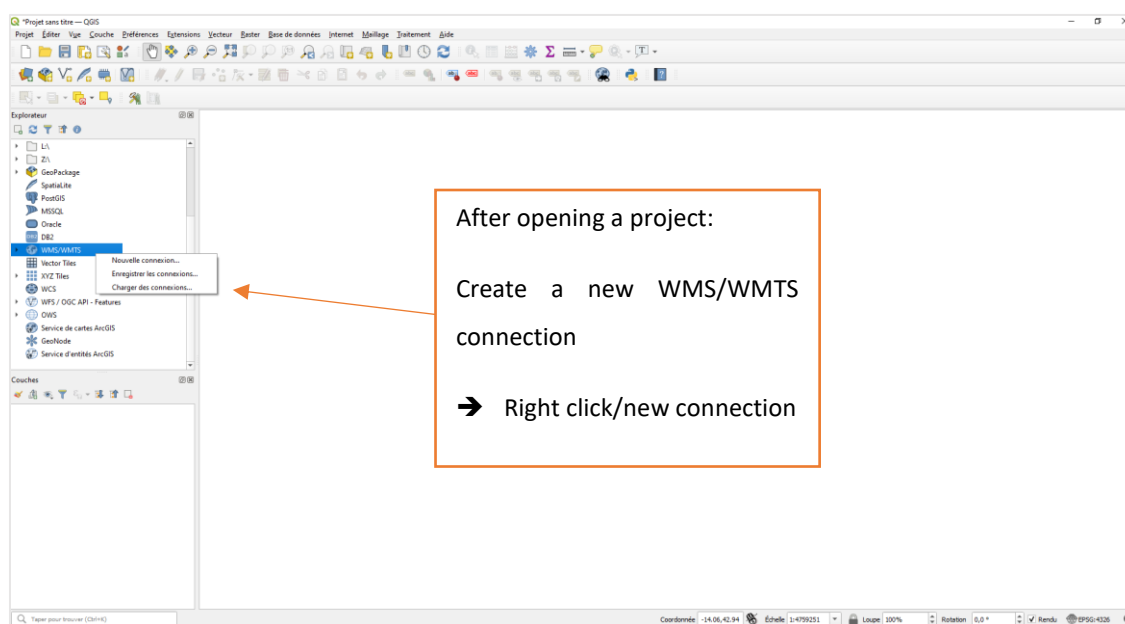- ➢ For Shom, the connection to adapter 1 ("consumer") is made via the URL http://10.40.200.2:8080/wms

Figure 5: Add a new WMS connection in Qgis

Figure 6: Connection to Shom datasets through CISE

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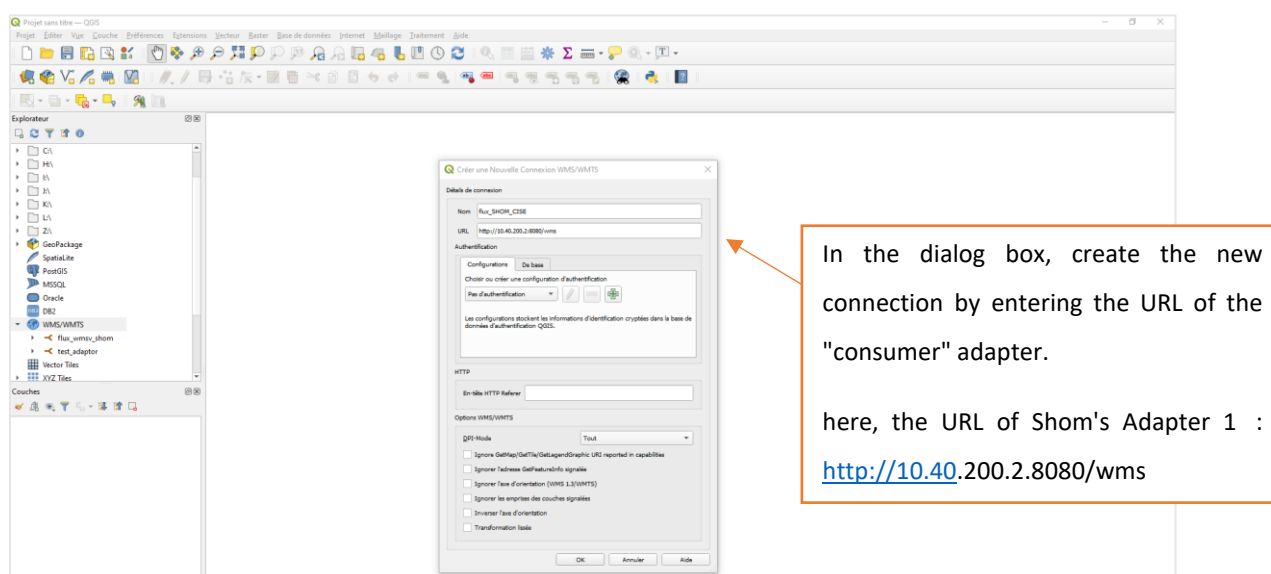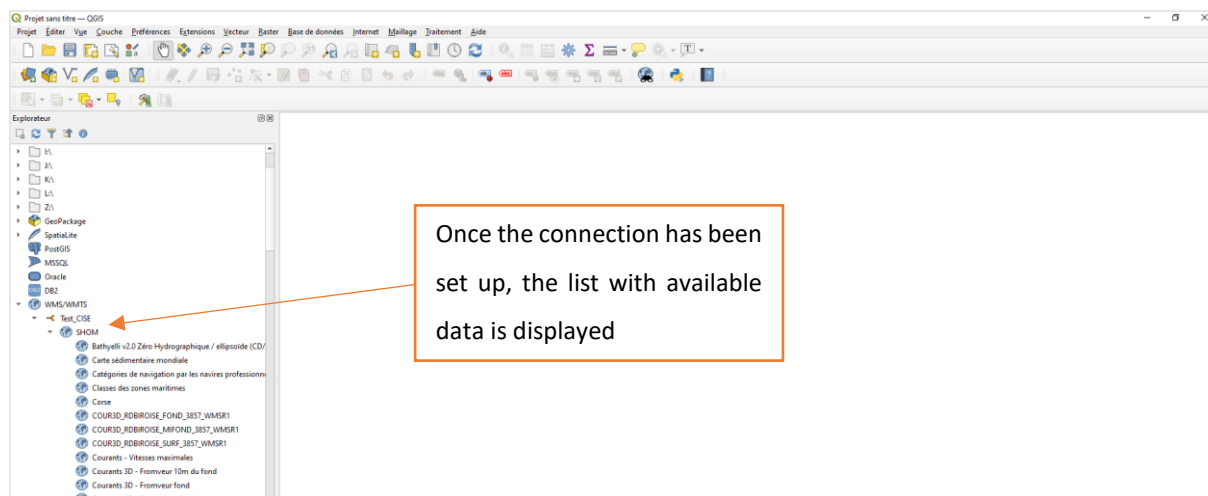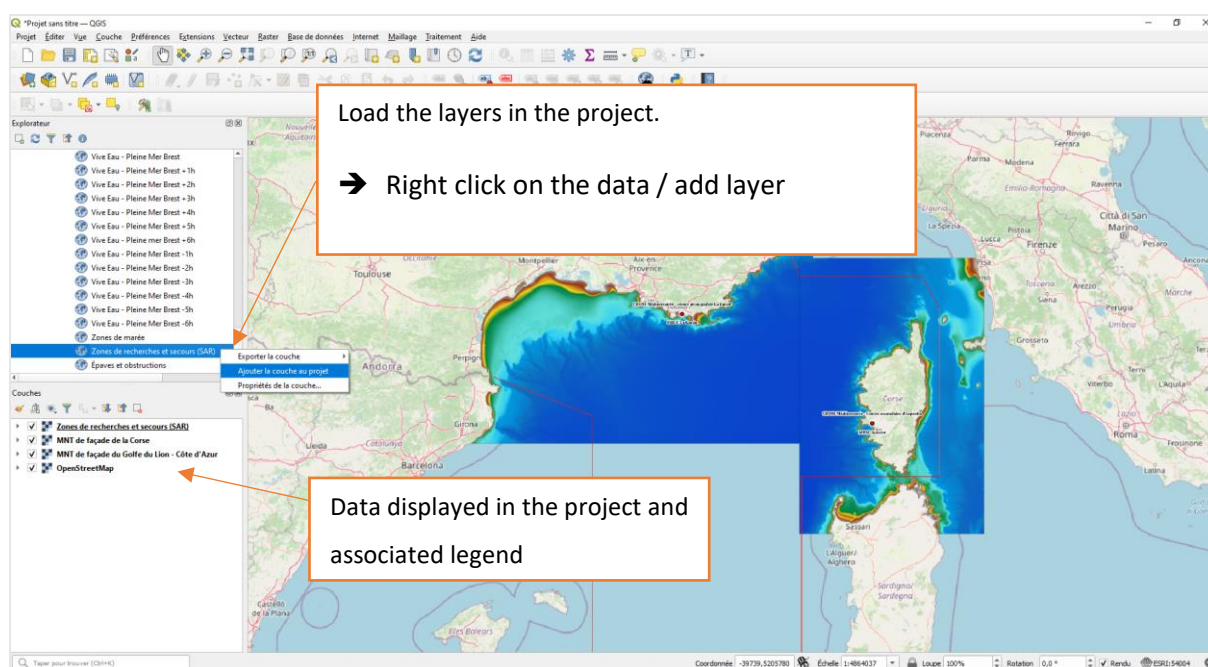*Figure 7: Load the data available on the web service*

Figure 8: Data display via Qgis

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