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# IALA GUIDELINE

## GXXXX USE CASES FOR MCP SERVICE REGISTRY

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## 1 INTRODUCTION

This is a common location for the definition of the main use cases for the MCP Service Registry.

The scope of these use cases is not confined to the strict limits of the Service Registry, but also includes external MCP operations such as the global discoverability and the MCP trust system.

## 2 TERMINOLOGY

- MCP Service Registry or MSR: a standardized system for the discovery and documentation of services used within the maritime domain, at its conceptual level
- MSR Instance: a service registry that follows the MSR specification provided by a MSR Service Provider
- MSR Service Provider: an MSR instance operator within a MCP domain
- MCP domain: a designated group within the Maritime Connectivity Platform (MCP) encompassing related assets identified and managed by an MCP Identity Provider
- MSR search domain: a predefined scope of search, could be identical with one MCP domain or public services across multiple MCP domains depending on type of search

## 3 USE CASES

This section presents some of the most significant use cases identified so far.

In this context the **MCP domain** is defined as all the components, services and information included in a single MCP instance.

The communication between MCP domains is assumed to exist in a technology agnostic manner, so that it does not bind the established use cases to a single technology, such as the blockchain-based implementation of the MCP ledger. To define this technology agnostic inter-operation between the different MCP instances, we will be referring to the **Global MCP Search Platform**.

The **end-user** reference describes all human and non-human (machine) maritime actors that can operate as clients and request information from the Service Registry. Therefore in some of the following use-case definitions, the client might be not be referred to as an end-user, but with another more specific title, e.g. the planning office etc.

The following diagram shows a high level view of the general use cases in the MCP domain. The use cases are described in more detail below.

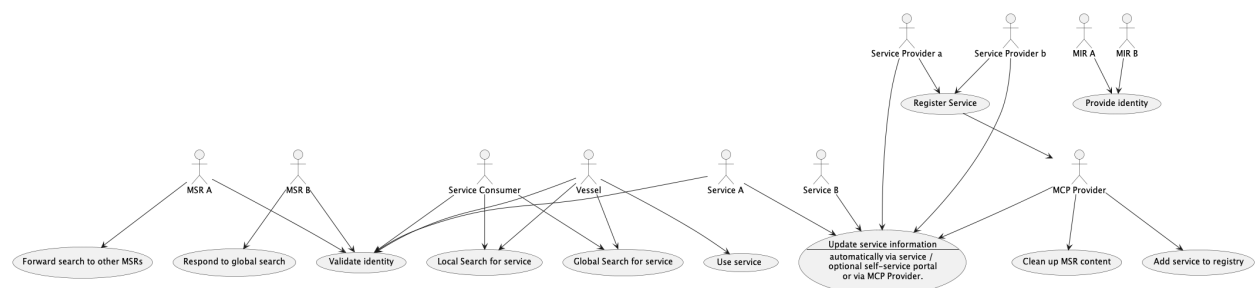


Figure 1: Use Case diagram

### 3.1 USER PERSPECTIVE REQUIREMENTS

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- Ship (User) expects to make ONE search and find services in MCP, across all MCP providers (MSRs)
- Ship (User) wants to be able to make geographical search (search for services providing service in certain area(s))
- User wants to find services of different (compliant) technologies in same search (e.g. SECOM, MMS, VDES, Web pages)
- User wants to be able to filter the result at least based on ServiceType, ServiceDesign, ServiceCoverageArea, ServiceStatus
- User wants to keep number of service calls and amount of data exchanged as low as possible
- User expects to understand service authorization and payment requirements from the returned response from the search

### 3.2 USE CASE LIST

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- Use Case 1: Global Search
- Use Case 2: Local Search
- Use Case 3: Global Maritime Search Platform

### 3.3 USE CASE 1: GLOBAL SEARCH

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- **Who:** End-user: any maritime information system
- **Wants to:** perform a search for a service
- **So that:** they can plan a route towards their destination

#### 3.3.1 DESCRIPTION

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The user of the information system intends to make a trip towards a destination and will need maritime information (such as Navigational Warnings, AtoN information) regarding their pre-selected route. To find the appropriate services that can provide that information, the end-user performs a search query to their respective MSR submitting as query parameters their

- route path or other geometry,
- the service design MRN and version which are compatible with their onboard equipment, and
- status is Released,

For example searching for Traffic Clearance Using SECOM would use the MRN `urn:mrn:iala:techsvc:sd:vts:tcs` in the `designId` parameter where the prefix without the version number defines the technical service design and the version number suffix is used to pass a semantic version that is supported (see <https://docs.npmjs.com/about-semantic-versioning#using-semantic-versioning-to-specify-update-types-your-package-can-accept>) to define allowed versions. Thus the version number 1.x would search for all services that implement version 1.0 or higher but less than 2.0 of the design.

Because of the nature of the trip, the end-user is aware of the need to perform a **global** search, .i.e. also search for the appropriate services in compatible Service Registries other than their own. However, the user does not need to add any extra parameters to the search when running the search operation as the default behavior of the search is to perform a global search.

#### Actors

- User using the end-user information system
- End-user (ECDIS, Route-Planning System or other information system)
- MSR Service of the end-user's MCP domain
- Global MCP Search Platform
- MSR Service from other MSR Service Provider
- Maritime Information Service (such as for Navigational Warnings, AtoN information) in different MCP domain

**Frequency of Use** Typically triggered when the end-user is planning for a trip far away from their base of operations.

#### Pre-Conditions

- The end-user is registered with a legitimate MCP instance.
- The end-user's MCP instance is interconnected with a compatible instance that does include in its domain a service that meets the end-user's requirements.

- All actors support the SECOM *searchService* interface.
- The consumer of the search supports the SECOM *upload* interface.

### Ordinary Sequence

1. User sends a search request to the MSR, including its route path and other criteria including a parameter specifying the callback URL.
2. The end-user's MSR searches its internal database and finds a matching registered entry.
3. The end-user's MSR will reply with the local search result and supply a `transactionId` that is used when returning results from the other MSRs
4. The end-user's MSR propagates the search request (along with the geometry provided description of the route) to the Global MCP Search Platform.
5. The Global MCP Search Platform will forward the search for other interconnected MSRs, which might have services that meet the requirements specified in the received request. The forwarded search must include the `transactionId` returned to the end user and must strip the callback URL of the end user.
6. The other MSRs will respond with the search results from their internal databases. If a search via the search platform does not produce any results the MSR should not respond with an empty result. The response must include the `transactionId`.
7. The end-user's MSR will collect all valid responses identified by the `transactionId` and compile a single list of search response entries.
8. The end-user will receive the service information list via the callback URL, which includes the endpoint information of the services returned.
9. The end-user will make a selection on which of the services it will contact.
10. The end-user will contact the selected maritime information service.
11. The data is rendered and displayed to the user.

**Note on returned data** The interface will return the service data by default as a subset of the full list of instance metadata defined in G1128 in JSON format as specified by SECOM. However, if the `includeXML` parameter is passed as true the return JSON will also include the full G1128 of the instance.

The certificates of the services are not returned. *Should we add a parameter to return certificate thumbprints (list of 1-3)?*

**Post-Conditions** The correct maritime information is received by the end-user.

## 3.4 USE CASE 2: LOCAL SEARCH

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- **Who:** An end-user registered with a legitimate MCP instance
- **Wants to:** perform a search for a service located in the same MCP domain
- **So that:** they can plan a route towards their nearby destination.

### 3.4.1 DESCRIPTION

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An end-user is a registered user of a legitimate MCP instance. They intend to make a trip towards a nearby destination and will need maritime information (such as Navigational Warnings, AtoN information) regarding their pre-selected route. To find the appropriate services that can provide that information, the end-user performs a search query to their respective MSR submitting as query parameters their route path, and the service design, MRN which is compatible with their onboard equipment.

The search parameters used in this case are the same as those defined in use case 1. This use case is a subset of UC1 with regards to the sequence of actions.

#### Actors

- End-user (ECDIS, Route-Planning System or human mariner)
- MSR Service of the end-user's MCP domain
- Maritime Information Service (such as for Navigational Warnings, AtoN information)

**Frequency of Use** Typically triggered when the end-user is planning for a trip in proximity to their base of operations.

#### Pre-Conditions

- The end-user is registered with a legitimate MCP instance.
- The end-user's MCP instance already includes in its domain at least one service that meets the end-user's requirements.
- The end-user maintains connectivity throughout the whole operation.
- All actors support the SECOM *searchService* interface.

#### Ordinary Sequence

1. User sends a search request to the MSR specifying that this is a local search only, including its route path and other criteria. A callback URL must not be provided as this identifies that the search is a local search only.
2. The end-user's MSR searches its internal database and responds directly to the end-user with a list of the currently registered services that meet the provided criteria. A `transactionId` is provided in the response to facilitate audit logging but end user must not expect any further responses.
3. The end-user will receive the service information list, which includes the endpoint information.
4. The end-user will make a selection on which of the services it will contact.
5. The end-user will contact the selected maritime information service.
6. The data is rendered and displayed to the user.

**Post-Conditions** The correct maritime information is received by the end-user.

## 3.5 USE CASE 3: GLOBAL MARITIME SEARCH PLATFORM (GMSP)

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- **Who:** An MSR that has received a global search from an end user
- **Wants to:** forward the search to other MSRs
- **So that:** they can return a list of available services that fulfill the search criteria.

### 3.5.1 DESCRIPTION

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A MSR receives a search from an end user that must be forwarded to other MSRs to perform a global search. The search is defined in UC1 and the actual search parameters with the exception of the geometry are not of interest from the perspective of this use case.

#### Actors

- End-user (ECDIS, Route-Planning System or human mariner)
- MSR Service of the end-user's MCP domain MSR
- The MMS network providing the GMSP
- Other MSRs participating in the GMSP (MSRa, MSRb, ...)

**Frequency of Use** Triggered whenever a user executes a global search against any compliant MSR.

#### Pre-Conditions

- The MSR is a participant in the GMSP
- The MSR knows the subjects defined in the GMSP
- The MSR maintains connectivity throughout the whole operation.
- All actors support the GMSP.

#### Ordinary Sequence

1. The MSR receives a search from the end-user.
2. The MSR generates a `transactionId` which is a UUID-v4
3. The MSR executes the search against its own database and returns the result including the generated `transactionId`
4. The MSR uses its internal mapping of the GMSP subject list to define which subjects the search needs to be published to according to the geometry of the search. For sake of example, the subjects applicable to the search are `subjectA` and `subjectB`.
5. The MSR strips the search of the callback URL and adds the `transactionId` to the search that is published in all of the relevant subjects in GMSP (`subjectA`, `subjectB`).
6. The MSR subscribes to the subject identified by the `transactionId`
7. MSRa is subscribed to `subjectA`; MSRb to `subjectC`; and MSRc to `subjectB` and `subjectA`, and MSRd to `subjectB`. MSRb does not see the search and does nothing.
8. MSRa executes the search in its own database and publishes a message in the subject defined by the `transactionId`.



9. MSRc executes the search in its own database and publishes a message in the subject defined by the `transactionId`.
10. MSRd executes the search in its own database and gets no result and thus does not respond in any way.
11. The MSR collates the responses from both MSRa and MSRc and pushes a response to the callback URL of the end user. The `transactionId` is used as the `transactionIdentifier` for the upload request so that the end user can identify which search the data upload is in reference to.

**Post-Conditions** The correct list of services is received by the end-user.