

# Maritime Resource Registry (MRR)

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## SUMMARY

The MRR is a MRN (Maritime Resource Names) centric registry capable of holding information about anything that has been assigned an MRN. The MRR will overall serve three purposes:

- Be a registry for IALA documents using MRNs as the unique identifier for the documents
- Be a registry of resources that are identified by an MRN
- Be a management system for MRN namespaces

IALA guideline G1143 'UNIQUE IDENTIFIERS FOR MARITIME RESOURCES' provides further information about MRN.

The MRR is being developed by KRISO under an MoU with IALA established on the 14<sup>th</sup> of December 2021.

This document is an update of the document on MRR submitted to ENAV29 (ENAV29-5.2.13)



# DISCUSSION

## Documents

The MRR is envisioned to make possible to retrieve the document based on its MRN. It basically just means that documents in the maritime industry will have an MRN “tattoo” – rather than an MRN sticker (that is - documents will have a stronger association with their MRNs).

## MRNs

MRN are identifiers that can be used for virtually anything in the maritime domain. Obvious examples are IALA documents, buoys and technical services. I. e. this can be both virtual or physical entities.

The MRR is envisioned to be a registry of resources that have MRNs. As such the MRR will for each resource contain:

- The MRN of the resource
- The name of the resource
- A short description of the resource
- A version of the resource in the format *MAJOR.MINOR.PATCH*
- A link to the original source of the resource

If the resource for instance is a Danish buoy – this could be a link to the national Danish buoy database – where it ideally should be possible to retrieve a full definition of the buoy by referring to its MRN

## MRN namespace management

In addition to storing information about individual MRNs, the MRR should also function as a management system for MRN namespaces (again – see the guideline on MRN for an explanation of this).

As a first step – this means that the MRR will be able to deliver information about a given MRN namespace, namely:

- The ABNF syntax of the namespace  
i.e. a full syntax for MRNs belonging to that namespace as defined by the organisation that has been given this namespace by IALA
- Information about the organisation owning the namespace



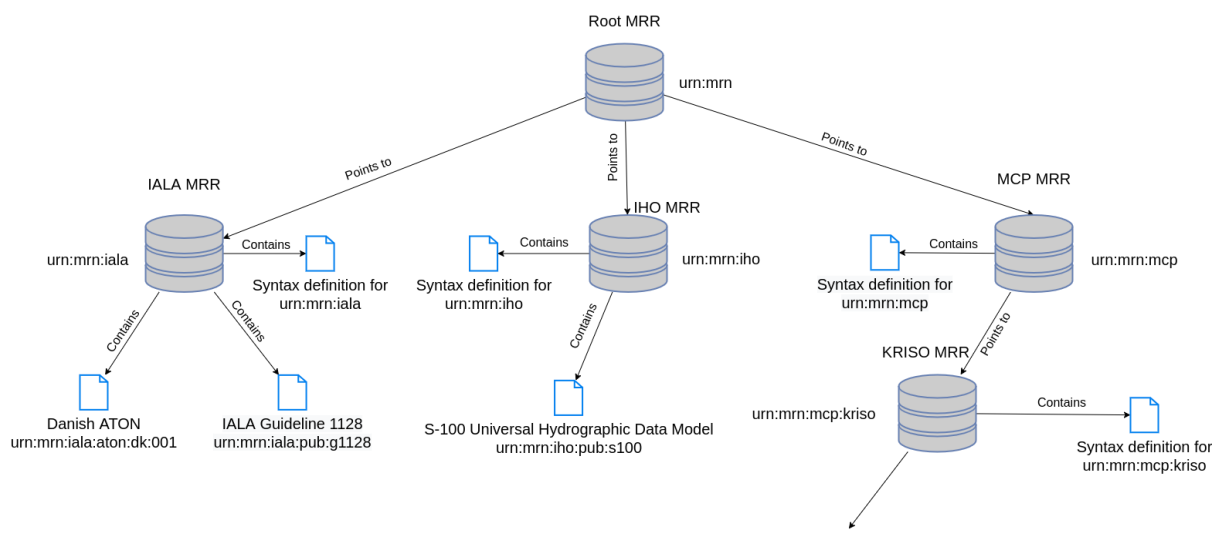
Below is the ABNF syntax for the MCP MRN namespace as an example.

```
mcp-mrn = "urn" ":" "mrn" ":" "mcp" ":" mcp-type ":" ipid ":" ipss
mcp-type = "device" / "org" / "user" / "vessel" / "service"
ipid = (alphanum) 0*20((alphanum) / "-") (alphanum) ; Identity provider ID
ipss = pchar *(pchar / "/") ; Identity provider specific string
alphanum = ALPHA / DIGIT ; rfc3986
pchar = unreserved / pct-encoded / sub-delims / ":" / "@" ; rfc3986
unreserved = ALPHA / DIGIT / "-" / "." / "_" / "~" ; rfc3986
pct-encoded = "%" HEXDIG HEXDIG ; rfc3986
sub-delims = "!" / "$" / "&" / "'" / "(" / ")" / "*" / "+" / "," / ";" / "=" ; rfc3986
```

## The distributed nature of the MRR

In the beginning there will only be the IALA MRR, but later it is envisioned that other organisations might have their own MRR. In this case the MRRs will basically be structured in the same way as MRN, which means the IALA will own a top (or root) MRR, and other MRRs will be linked to that in a tree structure.

The graph below illustrates this with examples of both several MRRs on several levels and sample namespace syntax definitions and individual documents and MRN entities.



## Status

A working prototype of the MRR that supports the required functionality has been made. The source code for this is available at <https://github.com/Digital-Maritime-Consultancy/MaritimeResourceRegistry>.



The prototype is written in the Java programming language and uses the Spring Boot framework as a basis for the implementation and the Neo4J graph database for persistence of data.

The interface to the prototype has been implemented as a REST API that exposes various endpoints for functions that allow users to interact with the MRR.

The list of functions that the prototype includes:

- Creating and deleting resources with MRNs
- Getting all versions of a resource with a specific MRN
- Getting a resource with a specific MRN and version
- Creating and updating references to other MRRs
  - An example of this from the figure above is that the “Root MRR” would have a reference to the “IALA MRR”
- Getting a reference to an MRR where a specific MRN or MRN namespace can be found
- Getting the syntax definition that applies to a specific MRN or MRN namespace

The functions for managing resources and MRR references both require authorization which has been implemented based on MRN namespace.

Creation of MRN namespace syntax definitions is currently handled using an external program written in the Python programming language. As part of the creation the program verifies that the syntax definition for the MRN namespace to be created is a subset of the syntax definition of the parent MRN namespace. An example of this could be that the syntax definition for the “urn:mrn:iala” namespace needs to be a subset of the syntax definition for “urn:mrn”.

The source code for this external program can be found at <https://github.com/Digital-Maritime-Consultancy/abnf-tool>.

A simple GUI will be developed for the MRR which will be used to test and evaluate the prototype implementation of the MRR, and any bugs and required changes will be fixed and implemented continuously as needed.

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