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**on**

**Unique Identifiers for Maritime Resources**

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***AISM***Association Internationale de Signalisation Maritime ***IALA***

International Association of Marine Aids to Navigation and Lighthouse Authorities

Revisions to the IALA Document are to be noted in the table prior to the issue of a revised document.

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| **Date** | **Page / Section Revised** | **Requirement for Revision** |
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**IALA Guideline No. #### on**

**Unique Identifiers for Maritime Resources DRAFT**

**Edition 0.0**

# Introduction

The use of unique identifiers is a necessary development of e-Navigation to maintain harmonization across domains and services. Navigationally unique objects such as aids to navigation, VTS products and services and other maritime services requires identification numbers to avoid duplication and misalignment of AtoN and Marine Safety Information (MSI).

Worldwide harmonized identification of Unique Identifiers for maritime resources can

* assist in the development and maintenance of enhanced data exchange applications for ship to ship, ship to shore, shore to ship, and shore to shore in the context of e-Navigation;
* assist administrations in the efficient delivery of Marine Safety Information (MSI).
* reduce the administrative burden associated with the maintenance associated with international list of lights numbers and other navigation products;

This is not unique to the maritime domain, and this guideline describes a syntax for Maritime Resource Names based on proven methods from the internet domain, that will enable IALA members to issue Unique Identifiers for objects such as AtoN, VTS products and services, Waterways, etc., in a format, which is designed to be compatible with existing lists of lights, yet interoperable with usage in different domains such as Electronic Nautical Charts.

The ‘Maritime Resource Name’ and the associated ‘Experimental’ namespaces defined by this guideline can be applied in numerous areas of application within the maritime domain, and other maritime stakeholders are invited to adopt this syntax for creation of unique identifiers.

[This DRAFT version (working document) of the guideline contains two examples of considered application of the Maritime Resource Name syntax to create unique identifiers for areas of application beyond the IALA domain]

## Related documents

ISO 3166-1

RFC 2141 – URN Syntax (<https://www.ietf.org/rfc/rfc2141.txt>)

S\_100 version 2.0.0 – Universal Hydrographic Data model

# Background

The International Hydrographic Organization (IHO) has noted in the paper HSSC6-5.4B the problems HOs may be confronted with if the existing light numbering schema is liable to changes by either the producing HO (national light numbers) or the UKHO (international light number).

The paper discussed the advantages of a Persistent Unique Identifier[[1]](#footnote-1) for lights and possible consequences. The support of the IMO e-Navigation solution S3 was highlighted. In addition, the possible effects on the workload for HOs which are deriving their products from a single database were mentioned. It was considered that some technical questions remain open for the time being.

The paper proposed the establishment of a close IALA-IHO liaison on the light numbering development in particular and additionally, the harmonisation of the light numbering systems between the IHO and the IALA to the widest extent.

## Background documents

IHO HSSC6-5.4B

IALA ENAV 15-14-1-12 – Liaison Note to ARM on IHO Proposal on Persistent Unique Identifiers

IALA ARM 1-11.1.5 - Liaison Note to ENAV on IHO Proposal on Persistent Unique Identifiers

IALA ENAV 16-9.29 - Comments on ENAV 16-9.10 by the IHO Standardization of Nautical Publications WG (SNPWG)

IALA ENAV 17-9-14 – Maritime Resource Names

# Discussion

Persistent global identifiers are needed in order to maintain data object identity as data objects pass through the data chain, are stored in different data stores, transformed to different formats, and re-purposed for different domains. The same chunk of information may be present in different data stores in different formats (ISO 8211, XML, relational database record, etc.). Using a single identifier for the same chunk of data in all formats and stores will obviously help harmonization, validation, and tracking of data across multiple application domains and at different places in the data supply chain. Similarly for data integration, especially references to features in a different data product and data set from the referring feature, require persistent identity.

Uniform Resource Names (URNs) as defined by the IETF (Internet Engineering Task Force, who have standardized protocols like IP, Http, FTP and other Internet protocols) are intended to serve as persistent, location-independent, resource identifiers and are designed to make it easy to map other namespaces (which share the properties of URNs) into URN-space. Therefore, the URN syntax provides a means to encode character data in a form that can be sent in existing protocols, transcribed on most keyboards, etc.

The URN syntax provides a mechanism to ensure the uniqueness of the name of a resource, which is already widely used in different domains such as supply chain management, unique identification of books or laws.

This guideline describes how the URN methodology is applied to identifying maritime resources within a Maritime Resource Name (MRN). This syntax allows decentralization of the management of identities.It is envisaged that already existing numbering schemes can relatively easily be fitted into this syntax, providing backwards compatibility, while the syntax is extendable to new areas of application.

# Requirements

Essential properties for a naming scheme are the following:

* **Unique.** Every id that is created must differ from any other id that is created.
* **Decentralized.** It must be possible to create ids without relying on a single global source that must be used every time an id is created. Essentially creating a single point of failure for the entire maritime sector. This, however, does not mean that there cannot be a central source for creating specific types of ids, for example, route ids. Similar to how creation of domain names are often delegated to various entities that each control a subdomain such as '.org', '.com', ‘.uk’ or ‘.no’.
* **Forward compatible.** It must be possible to add new naming schemes for new maritime domains in the future. In other words, a global naming scheme must be designed for evolution. Technologies will only come and go with an ever increasing rate in the coming years.
* **Flexible.** The naming scheme must be very flexible and allow for identifying any type of resource such as documents, cargo, routes, equipment, ships and mariners, giving no preference to any specific type of IDs.

There are also a number of properties that are \*nice to have\* for a global naming scheme:

* **Human readable.** A good naming scheme should be readable by humans in such a way that identifiers can be entered in forms and documents. Otherwise a simple solution such as creating a random 128-bit UUID similar to ‘de305d54-75b4-431b-adb2-eb6b9e546014’ would be the easiest solution.
* **Context.** A good naming scheme should give some idea of the *type* of resource that a particular identifier refers to. For example, is the identifier referring to a vessel, mariner, container, ATON, port or VTS center?
* **Backward compatible.** A lot of different maritime naming schemes already exist: IMO numbers, MMSI numbers and various forms of AtoN identification. A good naming scheme should allow some kind of integration with these existing schemes as they will continue to be used for many years to come.
* **Existing standards.** Preferable we should build upon ideas and standards that have already proven useful in other sectors.

URN’s fulfil all of these requirements and desired properties.

# Maritime Resource Name Syntax

The Syntax of a Maritime Resource Name (MRN) is based on [RFC 2141](https://www.ietf.org/rfc/rfc2141.txt) published by the Internet Engineering Task Force (IETF).

This implicates that any MRN can be represented in ASCII.

The identifier has a hierarchical structure as follows:

*"urn:mrn:"<NSS>*

The “urn” identifies this to be a special case of a Universal Resource Name (URN), while the “mrn” identify a unique namespace within the URN.

[Note: The “mrn” prefix should be registered by the [Internet Assigned Numbers Authority (IANA)](http://www.iana.org/assignments/urn-namespaces/urn-namespaces.xhtml) for IALA to be able to assign unique high level namespaces to stakeholders and domains within the maritime realm, based on the URN notation. It is assumed as a perquisite for publishing that in the process of approval of this guideline, that the RFC describing the “mrn” prefix will be accepted by the Internet Engineering Task Force (IETF). Insert RFC reference here, when published.]

<NSS> is the Namespace Specific String composed as follows:

*<NSS>::=<governing-organization>":"<type>":"<type-specific-part>*

Inserting “iala” as <governing-organization> will this create a namespace where IALA can define unique identifiers:

*"urn:mrn:iala:"<type>":"<type-specific-part>*

An example of identifiers related to Aids to Navigation could be an identifier scheme allowing decentralized management of identifiers for for lights and buoys. Here IALA choose to let the type specific part consist of <CountryCode>:<National Identifier>. For example

*urn:mrn:iala:aton:us:1234.5*

The identifier <type> defined by the prefix *"urn:mrn:iala:aton”* has certain syntax constrains which are described for this identifier type, in the Annex of this guideline relevant for the area of application. These constrains are designed to allow backwards compatibility with existing national identification schemes for AtoN, as well as ensuring interoperability between systems that use these decentrally issued identifiers.

## Extendability

The Maritime Resource Name is intended to be an extendable mechanism right across the maritime domain.

### Extended applications within the IALA namespace

In the future, IALA might decide to apply Maritime Resource Names to other areas of application, such as all IALA publications.

For example, a recommendation could be

*urn:mrn:iala:publications:recommendation:e-nav-140*

while the identifier of a guideline might be written such as

*urn:mrn:iala:publications:guideline:synchronisation-of-lights-1069*

Thus, the MRN provides an extendable convention for uniquely identifying new types of objects within the IALA domain.

Definitions of new areas of application of the MRN namespace within the IALA domain will be published as additional or amended annexes to this guideline.

### Extensions beyond the IALA domain

IALA’s members, sister organizations or other collaborating parties in the maritime sector are invited to join in the utilization of this Maritime Resource Name namespace.

Registering as a <governing-organization> under the Maritime Resource Name namespace requires that the organization in question is willing and able to publish and maintain publicly available definitions of identifier definitions under their responsibility.

Organizations wishing to register as a <governing-organization> under the MRN namespace, must request IALA to register their organizational abbreviation in Annex A of this guideline, together with a reference to where identifier definitions are published. This will ensure a registered and published namespace for uniquely defining identifiers under the control of the registering organization.

### The Experimental namespace “mrnx”

Development of good quality software frequently requires testing and validation of new functions or features in a realistic environment by realistic users, to prove a concept and take into account user feedback, before the technical details – such as datamodels, encoding formats or communication protocols are frozen and published as standards, recommendations or guidelines.

In order to support a ‘developer zone’ where new concepts can evolve *before* being published, an ‘experimental’ namespace is associated with the MRN namespace.

It is defined as

*"urn:mrnx:"<NSS>*

However the ‘x’ in “mrn**x**” identify this namespace to be of an *experimental* nature – in other words, and unstable version which has not yet reached the maturity of a published standard or recommendation. The intention is to provide a namespace, where concepts can be matured fairly freely in a developer zone, project or validation testbed, before it is published in a standard.

The <NSS> is the Namespace Specific String of same composition as for the “urn:mrn” namespace:

*<NSS>::=<governing-organization>":"<type>":"<type-specific-part>*

where *<governing-organization>* should represent a registered governing organizations under this guidelines Annex A, but *<type> and <type-specific-part>* may be unstable and not yet published definitions – and thus there is no obligation to provide a documentation reference, but a point of contact must be provided to request an experimental namespace.

The *"urn:mrnx:"* namespace may further be utilized to identify test datasets which conforms to published standards, but where the data content is intended for testing purposes only, and may *not* be used in an operational context.

During the technical implementation of a concept in software at an early stage, the software may be prepared for a transition from an experimental stage to a standardized stage, by constructing testbed software versions to apply exactly the same logic to information objects identified by ‘mrn’ or ‘mrnx’ prefixes. Taking the proven software to a production environment will thus be an easy transition, yet a simple differentiation between data that belong to a production (‘mrn’) and a test (‘mrnx’) environment is enabled – and methods to disallow testdata in a production environment can easily be applied.

## Context dependant representation.

The Maritime Resource Name syntax allows a context dependant representation of identifiers.

Inside the database or system of a national Aids to Navigation provider, the data format of the identifier of an AtoN does not need to be modified, because the context is known.

In the US AtoN database, the AtoN with national ID ‘1234.5’ is well known, but when communicating information about this AtoN to an external stakeholder, the MRN can be used as a ‘wrapper’ or a namespace prefix to the national identifier, making the identifier universally understood and unique:

*urn:mrn:iala:aton:us:1234.5*

Similarly, if the same MRN syntax was applied by the ITU to define a context for MMSI numbers, the unique identifier might look like this:

*urn:mrn:itu:mmsi:538070999*

In the context of exchange of information via AIS or DSC, the context of the identifier is known, and thus only the number *538070999* is needed for the number to be unique, but using the full MRN description will guarantee, that the identity is unique and the context is clear, although *538070999* could just as well represent a telephone number in a different context.

## General MRN Guidelines

While in general governing organizations will be free to structure their namespace in any way they see fit, these general guidelines are provided:

* The *<governing-organization>* of a namespace under the ‘urn:mrn’ namespace must provide a website where standards that specify identifier <type>s under their domain are the published. Annex A and lists all *<governing-organization>*’s who have registered their organizational abbreviation for utilization of the MRN namespace. Subsequent Annexes of this IALA Guideline #### specifies the Unique Identifier types defined under the ‘urn:mrn:iala’ namespace.
* The syntax of the … [KASPER to fill in…]
* Every identifier that refers to a national domain, uses standards available in ISO 3166-1 alpha-2 Codes for the representation of names of countries and their subdivisions*.*
* *…*

# Areas of application

The <governing-organizations>’s that have registered to utilize the “urn:mrn” and “urn:mrnx” namespaces are listed in Annex A.

This guideline provides the following identifier <type> specific definitions of syntax constrains under the IALA namespace in the following Annexes:

1. Current Areas of application of Maritime Resource Names

|  |  |
| --- | --- |
| **ID types** | **Syntax constrains** |
| Aids to Navigation | ANNEX B |
| VTS services | ANNEX C |
| Waterways | ANNEX D |
| *To be determined based upon future need and development of additional requirements* |  |

1. Registered governing organizations under MRN(x)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Governing Organization** | **Namespace(s)** | **Documentation reference** | **Website / point of contact** | **Notes** |
| IALA | urn:mrn:iala:  urn:mrnx:iala: | IALA Guideline ####  (This document) | http://www.iala-aism.org/products/publications/ |  |
| STM Validation  project | urn:mrnx:stm: | To be developed | <http://monalisaproject.eu/>  Point of contact:  per.setterberg@sjofartsverket.se | Eksperimental namespace only.  Expires by  December 31st 2018  APPENDIX 1  provides examples |
| EfficienSea 2  project | urn:mrnx:e2: | To be developed | <http://efficiensea2.org/>  Point of Contact:  thc@dma.dk | Eksperimental namespace only  Expires by  December 31st 2018 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

1. MRN for Aids to Navigation

A unique identifier for an Aid To Navigation should be assigned by the responsible Aids to Navigation Authority on a national basis.

When referenced outside the context of the national AtoN provider, the identifier should be prefixed using the Maritime Resource Name syntax, with the prefix:

*urn:mrn:iala:aton:<countrycode>:<NationalIdentifier>*

where <countrycode> is the national identification defined by ISO 3166-1 alpha-2 codes for the representation of names of countries and their subdivisions.

Example:

*urn:mrn:iala:aton:us:1234.5*

denote the AtoN with identifier 1234.5 defined by the AtoN authority of the United States of America.

When referenced within the context of the national AtoN provider, only the national identifier is required (e.g. 1234.5). Ref Section 3.2 of this guideline.

1. MRN for Vessel Traffic Services

[Development of this annex will require liaison between the VTS and ENAV committees]

A unique identifier for a VTS service …?

*urn:mrn:iala:vts:<countrycode>:<NationalIdentifier>*

where <countrycode> is the national identification defined by ISO 3166-1 alpha-2 codes for the representation of names of countries and their subdivisions.

Example:

*urn:mrn:iala:vts:nl:xxxxxx*

denote the VTS service xxxxxx in the Netherlands.

1. MRN for Water Ways

A unique identifier for a Water Way are frequently used in a list of lights to group AtoN according to their location.

[This annex needs to be progressed further – by which committee?]

National water ways defintions

*urn:mrn:iala:wwy:<countrycode>:<NationalIdentifier>*

where <countrycode> is the national identification defined by ISO 3166-1 alpha-2 codes for the representation of names of countries and their subdivisions.

International water way definitions (meaning any waterway definition involving more than one country.)

*urn:mrn:iala:wwy:xz:<???>*

*[Reference to UNLOCODES reserving the code ‘xz’ for international]*

1. Example Usecase: Universal Voyage ID (UVID) and Universal Port Call ID (UPCID)
   1. Background

The STM validation project, cofounded by the European Union under the TEN-T programme, intends to validate concepts related to Strategic and Dynamic Voyage Management, as well as interactions between ships and Port under the concept of Port Collaborative Decision Making.

As part of the project, the need for *universally unique identifiers* to identify instances of a ships voyage (to be accessible via a Voyage Service) and instances of a a port call (via a Port Call Service) has been identified as required enablers of the concepts to be validated, including definition of relevant harmonized information objects to represent a ships voyage and states or events related to a portcall, based on experience from previous projects such as MonaLisa 2.0 and PRONTO.

These identifiers resemble identifiers utilized in logistic chain operations, for which GS1 (Global Standards One) have created a number of standards, for instance the [EPCIS](http://www.gs1.org/docs/epc/epcis_1_1-standard-20140520.pdf) (Electronic Product Code Information Services) – however support for some features desired for application in a maritime context needs to be further developed, and the relation to the e-navigation strategy, the Single Window concept and S-100 data modelling regime needs to be evaluated.

The project wishes to apply the Maritime Resource Name methodology to test and validate the concepts in the maritime context, before bringing them to relevant standardization bodies, and has requested to be registered as <governing-organization> for an experimental namespace (listed in Annex A):

“urn:mrnx:stm:”

* 1. Universal Voyage\_ID (UVID)

The update of IEC 61174 teststandard for ECDIS in 2015, introduced a standardized dataformat for representation of a ships voyageplan (the RTZ format).

This format includes an identifier field, which can be used to uniquely identify an instance of a ships planned voyage, throughout the lifecycle of the voyage from strategic planning, through the dynamic updates underway, until completion. When communicating updates between any group of stakeholders, a globally unique identifier is needed, and methods to manage the version history of changes applied.

The STM project intends to establish the concept of a ‘Voyage Service’ as the point of contact to enable authorized parties (nominated collaborators such as agents, pilots, ports, VTS’es etc.) to interact electronically with information related to a ships voyage.

It has been observed that centralized methods for issuing unique identifiers (such as Global Unique Flight Identifiers in the aviation industry) demand connectivity in the time of creation. This is seen as an undesirable requirement and possible point of failure. Instead a delegated approach, where each registered provider of a Voyage Service is delegated the ability to issue their own identifiers is desired.

The project builds on an extension of the Maritime Cloud concept denoted SeaSWIM, which assumes that a *Service Registry* exist, which will enable discovery of all instances of standardized Voyage Services – and that all registered instances of a Voyage Service contain a unique Voyage\_Service\_Provider\_ID.

The following definition of the UVID is proposed for the project:

“urn:mrnx:stm:uvid:”<uvspid>”:”<localid>”[:”<version>]

where

* <uvspid> denotes a Voyage\_Service\_Provider\_ID defined as:
  + ”*<governing-organization>"-"<vsid>"*
    - *<governing-organization>* islowercase alphanumeric values (a-z, 0-9, no space or other special characters) and denotes an organization which guarantees the uniqueness of the Voyage\_Service\_ID (<vsid>)
    - *<vsid>* is lowercase alphanumeric values (a-z, 0-9, no space or other special characters) and denotes a unique number identifying a single provider of the Voyage Service under the domain of *<governing-organization>.*
* <localid> is an ID (lowercase alphanumeric values (a-z, 0-9, no space or other special characters – a serialnumber or similar) issued by the provider of the Voyage Service, which is guaranteed to be unique *within the context of this particular instance of a Voyage Service* by the provider of the service.
* <version> is an optional extension, which is defined as: <major\_version>[“.”<minor\_version>]
  + <major\_version>: Numerical characters (0-9, no space or special characters). A major version number is only incremented, when the OWNER of a voyage (during the voyage: the ships captain) commits changes to it’s geometry or planned (targeted) schedule/timing.
  + <minor\_version>: Optional field - numerical characters (0-9, no space or special characters). Minor version number is incremented, every time a collaborating actors provide a proposed change to a voyage (change of route or timing) or when calculated ETA at waypoints marked with a planned/target time of arrival changes (more than a set threshold value). If the owner of the voyage approves and commits a proposed change of route or planned timing, the major version is incremented, and the minor\_version reset to 0.

**EXAMPLE**

“urn:mrnx:stm:uvid:stm-a:134:1” denotes voyage number “134” (version “1”) held at Voyage Service Provider “urn:mrnx:stm:uvspid:stm-a”.

If a Port receives notification, that the voyage with UVID “urn:mrnx:stm:uvid:stm-a:134:1” is intending to arrive at their port at a certain Planned (Target) Time of Arrival, and the port may start planning the Port Call.

The Port can then identify the <uvspid> (“stm-a”) from the UVID, and discover the address of the Voyage Service “stm-a”, using the search parameter “urn:mrnx:stm:uvspid:stm-a” in the Service Registry.

Based on the reply from the service registry, they know which Voyage Service to query for information about the approaching ship, based on the standardized interfaces of a Voyage Service.

Assuming that the port is nominated as collaborator for this voyage by the owner of the voyage (the captain), they can retrieve the information allowed by the owner.

The port may wish to propose a different time of arrival for this particular voyage. They send their proposed time of arrival for voyage “urn:mrnx:stm:uvid:stm-a:134” to the Voyage Service “stm-a”, which will increment the <minor\_version> and generate version “1.1” of the voyage “stm-a:134” inside the Voyage Service, triggering a notification of the owner of the voyage that a new proposal has been made. IF the owner approves the proposal 1.1, then a version “2.0” is generated, and all nominated collaborators subscribing to updates of that Voyage are notified.

* 1. Universal PortCall\_ID (UPCID)

The STM project intends to establish the concept of a ‘Port Call Service’ as the point of contact to enable authorized parties (nominated collaborators to a Port Call, such as the master of a ship, the Port master, agents, pilots, tugs, ports, VTS’es, terminals etc.) to interact electronically with information related to a particular Port Call.

The following definition of the UPCID is proposed for the project:

“urn:mrnx:stm:upcid:”<upcspid>”:”<localid>”[:”<version>]

where

* <upcspid> denotes a Port\_Call\_Service\_Provider\_ID defined as:
  + ”*<governing-organization>"-"<pcsid>"*
    - *<governing-organization>* islowercase alphanumeric values (a-z, 0-9, no space or other special characters) and denotes an organization which guarantees the uniqueness of the Port\_Call\_Service\_ID (<vsid>)
    - *<pcsid>* is lowercase alphanumeric values (a-z, 0-9, no space or other special characters) and denotes a unique number identifying a single provider of the Port Call Service under the domain of *<governing-organization>.*
* <localid> is an ID (lowercase alphanumeric values (a-z, 0-9, no space or other special characters – a serialnumber or similar) issued by the provider of the Port Call Service, which is guaranteed to be unique *within the context of this particular instance of a Port Call Service* by the provider of the service.
* <version> is an optional extension, and it’s use may change during the project. It is proposed as: <major\_version>[“.”<minor\_version>]
  + <major\_version>: Numerical characters (0-9, no space or special characters). A major version number is only incremented, when the OWNER of a Port Call (may depend on local organization of the port) commits changes to the planned (targeted) timing of arrival or departure.
  + <minor\_version>: Optional field - numerical characters (0-9, no space or special characters). Minor version number is incremented, every time a collaborating actors provide a notification of a changed state or planning time.

**EXAMPLE**

A Port Call Service provided by Port Call Service Provider X “urn:mrnx:upcspid:stm-x” on behalf of Port P receives notification, that the voyage with UVID “urn:mrnx:stm:uvid:stm-a:134:1” is intending to arrive at their port at a certain Planned (Target) Time of Arrival.

Since there is no Port Call registered that relate to voyage “urn:mrnx:stm:uvid:stm-a:134” in Port P, a new Port Call ID is generated (version 1): “urn:mrnx:stm:upcid:stm-x:2899:1” which relates to the inbound voyage “urn:mrnx:stm:uvid:stm-a:134:1”. The Voyage Service is that notified by the port of the reference ID of the Port Call – and a relation between the Voyage information and Port Call information now exist.

The port might notify the local VTS that Port Call “urn:mrnx:stm:upcid:stm-x:2899:1” is created, and the VTS with access to the local Port Call System can that way identify that voyage “urn:mrnx:stm:uvid:stm-a:134” is approaching. The VTS can discover the address of the Voyage Service “stm-a”, and based on the reply from the service registry, they know which Voyage Service to query for information about the approaching ship, based on the standardized interfaces of a Voyage Service. If the VTS is nominated as collaborator for this voyage by the owner of the voyage, they can retrieve the information allowed, related to the most recent major version of the voyage, or register for being notified of updates.

If the VTS is not nominated as a collaborator, they may request access, and the owner of the voyage will be notified of the request and make his decision.

The Owner of the inbound Voyage “urn:mrnx:stm:uvid:stm-a:134” related to Port Call “urn:mrnx:stm:upcid:stm-x:2899:1.0”, may request that certain local port actors such as pilots, tugs, terminals, etc. are nominated as collaborators to this particular Port Call, and may thus access and collaborate in the planning related to the Port Call of this ship.

* 1. Post project considerations for utilization of the UVID and UPCID identifiers

Assuming that the STM validation project delivers a positive validation of this way to handle UVID’s, UPCID’s - and associated service provider ID’s, the construction of these identifiers may be brought forward as a proposal for a standard to be published by some relevant standardization organization.

Regardless of which standization organization is identified as the relevant host of such a standard, the intention will be to replace the prefix of the identifier construction (“urn:mrnx:stm:”) with another prefix, identifying the relevant host organization. Possible results could be:

* “urn:mrn:stm:” if the STM project ends up establishing a STM governing organization
* “urn:gs1:” if the STM project ends up proposing the STM services to become GS1 standards
* “urn:mrn:ihma:” should the STM project end up proposing IHMA (International Harbour Masters Association) as the host for standardizing the STM services.
* …

Either way, the technical implementations of STM Services in the testbeds may be prepared through configuration to accept another prefix than the “urn:mrnx:stm:” as the ‘production’ prefix of STM services, leaving the “urn:mrnx:stm:” as an indication that data belong to a testbed, rather than production environment.

1. Example use case: Unique identifiers for Navigational Warnings

Based on draft considerations in collaboration the Danish Maritime Authority and SHOM in France, the following draft ideas for utilization of Maritime Resourse Names to uniquely identify Navigational Warnings, have been discussed. This is provided entirely as draft inspirational examples of application of the MRN syntax to challenges outside the IALA domain, and not intended to prejudge work of other maritime organizations:

…

Assume that IHO define a namespace for Navigational Warnings. For NAVAREA WARNINGs, IHO might define global syntax rules like this:

“urn:mrn:iho:nw:navarea:”*<navareanumber>”:”<noticeNumber>*

* *<navareanumber>” is an integer (1-12)*
* *<noticeNumber> is the notice number as defined in S-124*

For local warnings, the definition might look like this:

“urn:mrn:iho:nw:”*<countrycode>:<NationalIdentifier>*

Assume that France had made a local adaptation of the *<NationalIdentifier>* to accommodate local offices issuing own identifiers. The format for NW numbering could e.g. be something along the lines of: "urn:mrn:iho:nw:fr:Local-AVIRADE-Brest:2016:001"

Denmark might have a different definition of *<NationalIdentifier>*

"urn:mrn:iho:nw:dk:2016-0123-2.4" (Danish Navigational Warning no. 0123 of 2016, version 2.4).

As long as some relevant restrictions apply to the syntax of the construction of the identifiers, technical systems can be designed to handle most existing constructs of identifier definitions, ensure that issuing of globally unique identifiers can be delegated through multiple layers.

…

1. IALA chooses the term Maritime Resource Names of the concept of a Persistent Unique Identifier in order to expand this concept into VTS and waterway management and other areas of maritime activity. [↑](#footnote-ref-1)