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Author(s) / Submitter(s)	Mikael Lind for the STM validation project Viktoria Swedish ICT (Sweden) Swedish Maritime Administration (Sweden) Valenciaport Foundation (Spain)

Port Call Message Standard, version 0.5

1 BACKGROUND

Ship-to-port, port-to-ship, port-to-port, as well as port actor-to-port actor communication needs to be standardized and precise in order to contribute to efficient coordination of port calls. In this information paper the port call message standard is presented. This has been developed based on 1) multiple instances of Port Collaborative Decision Making (PortCDM), as a sub concept of Sea Traffic Management (STM) validated within the STM validation project, in different ports, and on 2) joint efforts with contemporary developments (such as the emerging time stamp standard, route exchange format, EPCIS according to GS1, and standards adopted by port community systems and National Single Windows) using time stamp standards. The port call message standard builds upon the idea takes as its point of departure, the business logic, i.e. the understanding of how to conceive a port call, in order to derive time stamps relevant to share information about.

2 THE PORT CALL PROCESS CONCEIVED

A port call process is conceived as divided into three process steps; Arrival, Port Visit, and Departure, and two contextual process steps; pre-arrival and post-departure. The Port Visit reflects the purpose of call. Each process step is to be conceived as existing of different sub processes and each sub process covers a number of events (see figure 1 below). Dependent of the purpose of call there will be different combinations of sub processes and events. This hierarchical structure provides a capability to position a state as part of an event, an event as part of a sub process, and a sub process as part of a process step, providing basis for deriving situational awareness for enhanced co-ordination. Sub processes and events could be conducted sequentially and in parallel. During a port call there will always be an arrival and departure process step and most likely a port visit. Combination of sub processes and events are dependent of the purpose of call.

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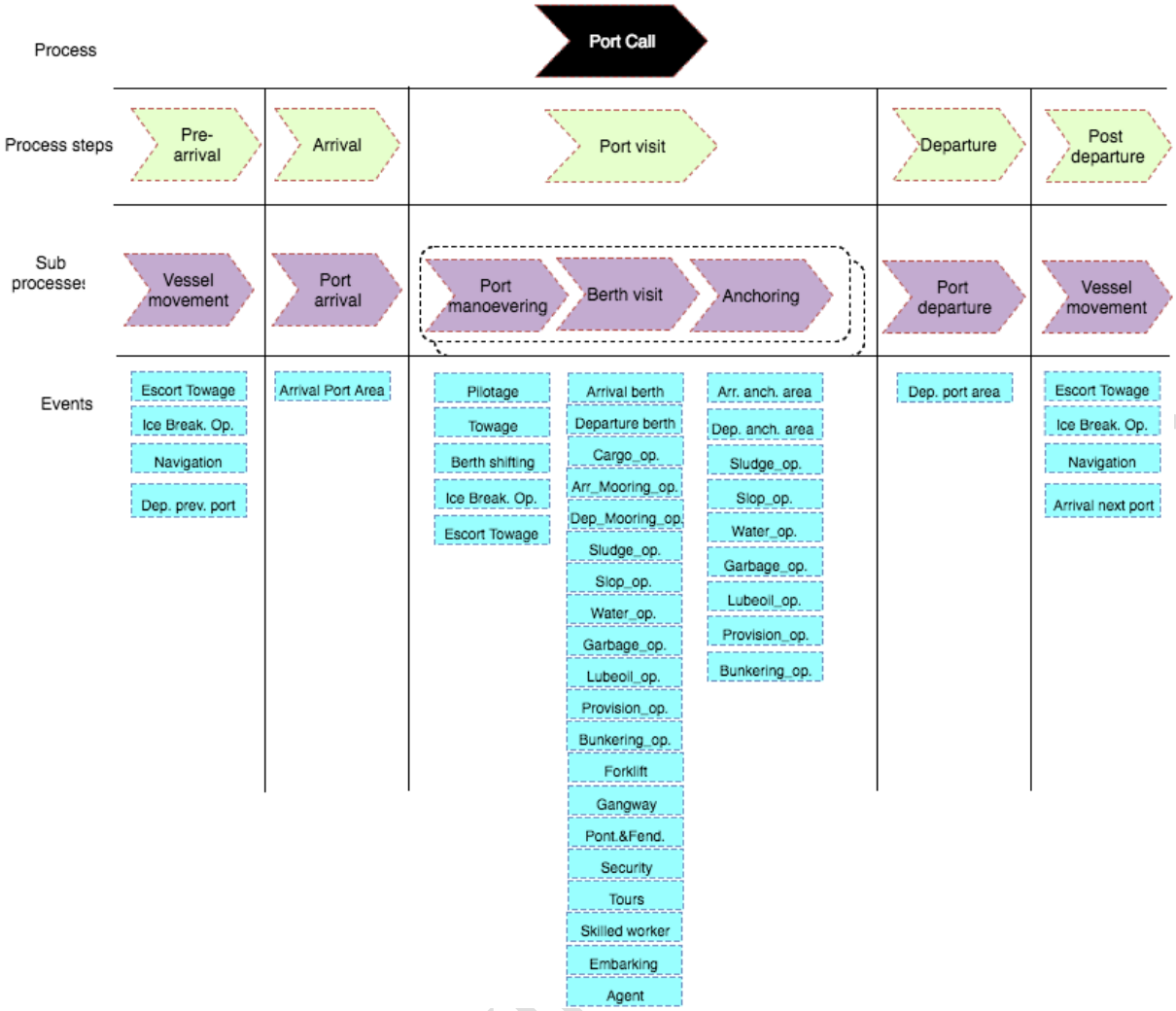

Figure 1: The conception of a port call process

A port call is thus a process composed of process steps for arrival, port visit, and departure putting the operations associated with the turn-around process of the vessel at the core. The arrival process consists of port arrival sub process. The port visit is composed by series of port manoeuvring, berth visit, and anchoring sub processes. As indicated in figure 1 the port visit can be constituted by multiple port manoeuvring, berth visit, and anchoring events. In this way berth shifting can be captured. The departure process step captures the port departure as a sub process. From a port perspective, the arrival step is preceded by pre-arrival capturing sub processes related to actions related to the vessel's journey stretching back to the departure from previous port, and the departure step is succeeded by actions related to the vessel's journey stretching to the arrival to the next port.

In figure 2, a metro map is used as the metaphor for illustrating the complexity, and the need for collaboration between multiple actors, in staging a port call. The metro map expresses a positioned state catalogue in relation to the port call process and its actors on a generic level. The metro map is also a source for inspiration for different dashboards being used, adapted to each actor's needs, for providing situational awareness enabling informed decisions on collaborative foundations to be made by each actor. In figure 2, each metro line represents an actor and each metro station represents a state — such as a location state or service state — that is of importance for the coordination of the port call process. The metaphor illustrates a flow of states having a coordinating function in a port call, from the arrival of a vessel (left part of figure 2) to its departure (right part of figure 2). By including states related departure previous port and arrival next port the port visit at the focused port can be associated to a chain of port visits and thus enabling port-to-port collaboration.

As depicted in figure 2, there are several states that indicate a high degree of coordination and synchronized performances from several actors. The states that require two or more actors to be

synchronized in time and/or space are referred to as coordination points. States prior to coordination points are as important for an optimal realization of a port calls but are more actor specific in their nature and are defined as actor specific milestones.

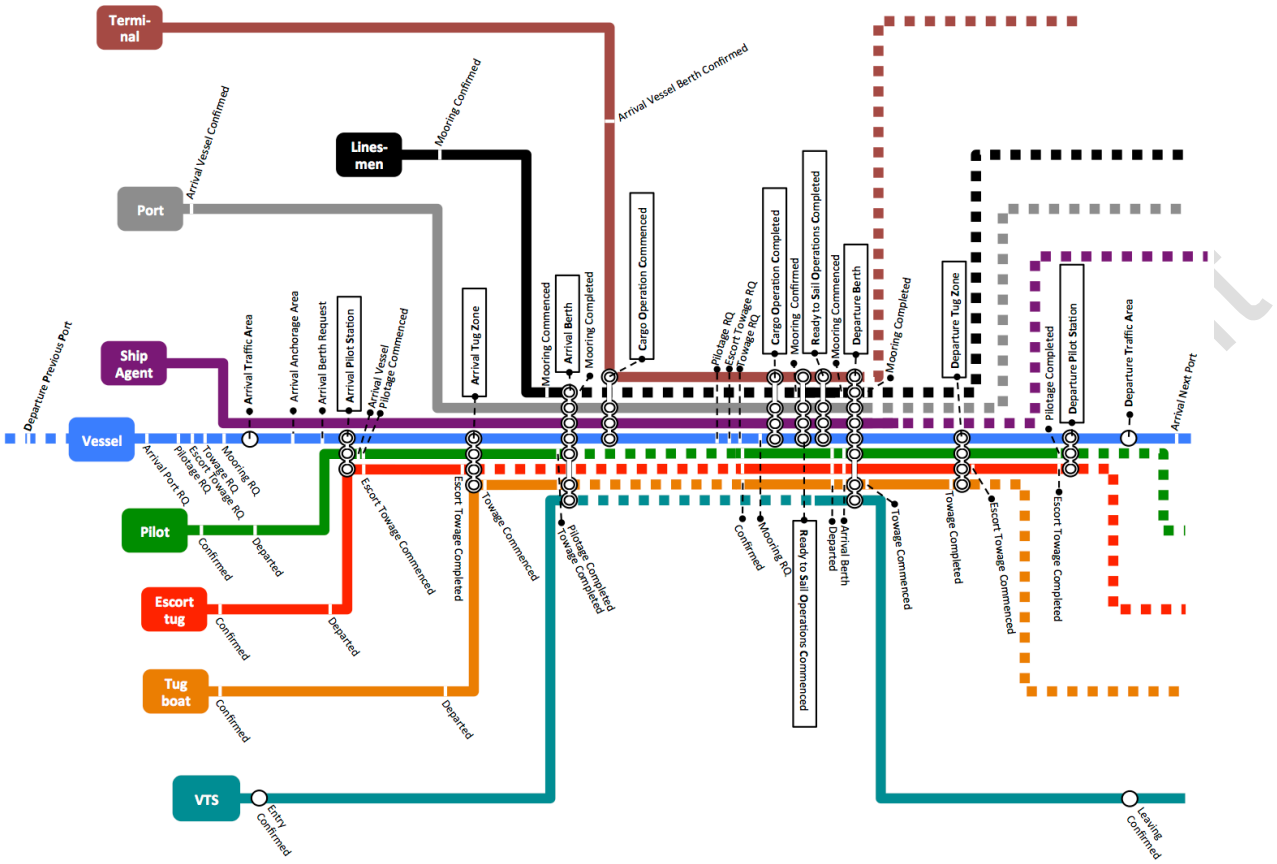

Figure 2: States and coordination points in the port call process
- a generic state chart used for port specific adaptation of the PortCDM concept[3]

The composition of states related to a particular event represent stages of progress for an event, as e.g. the result of the event towage_requested is an indication of the progress of the event towage.

3 THE CONSTITUENTS OF TIME STAMPS

To a particular state there are different communicative functions that are associated. The time of when a particular state should be reached could be **recommended** to someone(s) for its occurrence (as e.g. a recommendation of when the vessel should initiate the port visit). The time of when a particular state could be **targeted** of when it is aimed to occur as well as **estimated** of when it is expected to be occur. When a state has occurred its status becomes **actual.** The intentions of reaching a particular state could also be **cancelled**.

These different time types, i.e. *recommended*, *targeted*[4], *estimated*, *actual, and cancelled* are different possible time types that could enable enhanced coordination among involved actors. Associated states to an event represents the progress of the event, is initiated by the progress of other states (within the same or in other events), and could trigger other states (within the same or in other events).

A state could concern the certain time a physical object has arrived at, or departed from a particular geographical spot (**location state**), such as the vessel is at berth (all fast), and the certain time a particular service is to be commenced or completed (**service state**), such as cargo operations are commenced.

[3] Lind, M., et al., *Overcoming the inability to predict - a PortCDM future*, in *10th International Harbor Masters' Association Congress – Global Port & Marine Operations*. 2016: Vancouver, Canada.
[4] Within the ECDIS community (for navigational purposes), "planned time" is used for expressing the targeted time.

Commencing and completing a service is normally preceded by sequences of communicative acts such as requested, request received, denied, and confirmed regulated in the time sequence of the state (see section 3.2) below.

A unique combination of time type and state type constitute the time stamp (figure 3), as e.g. *Estimated Time of Arrival Vessel at Pilot Boarding Area* which is the specification of what is often referred to as ETA. This suggested level of granularity specifying what it concerns (reference object, see section 2.2.1 on location states) and to which location, decreasing the probability for misunderstanding.

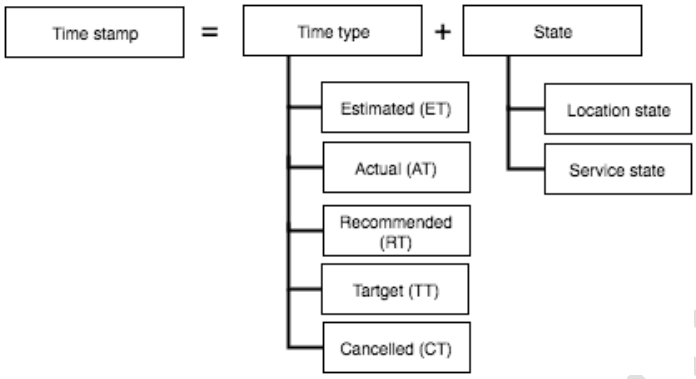

Figure 3: The constituent of a time stamp

A full list of, so far, identified states (including abbreviations and synonyms) associated to a port call is captured in appendix II. This list of location and service states are to be seen as generic. In future versions of the port call message standard different types of states associated with different types of port calls, such as cruises, container traffic, wet and dry bulk, ferries etc. will be pinpointed.

3.1 Location states

A location state captures the location (such as traffic area, berth, tug zone, pilot boarding area, etc.) to which a reference object (such as vessel, pilot, tug, etc.) arrive to or depart from (figure 4). As for example, based on the nomenclature for a location state an arrival for a vessel to traffic area is expressed as *Arrival_Vessel_Traffic_Area*. A location state is thus defined by a unique combination of time sequence, reference object, and from_location/to_location.

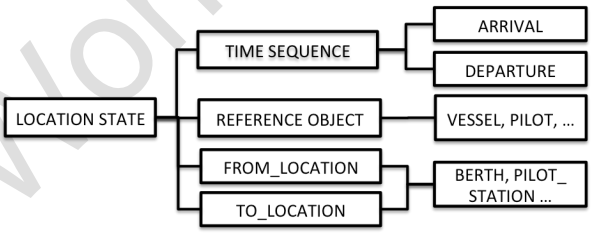

Figure 4:The constituents of a location state

In other words, a reference object is the object that changes location. The following reference objects have been identified so far (extensible list for future versions of the port call message standard):

• Vessel	• Pilot	• Ice Breaker
• Tug	• Escort tug	• Passenger
• Agent	• Arrival Moorer	• Security
• Departure Moorer	• Pontoons & Fenders	• Skilled worker
• Gangway	• Pilot Boat	

For an arrival state the to_location is mandatory and the from_location is optional and for a departure state the from_location is mandatory and the to_location is optional. The following locations have been identified so far (extensible list for future versions of the port call message standard):

• Anchoring Area	• Berth	• Etug zone
• Variable locations	• Pilot Boarding Area	• Rendezvous Area
• Traffic Area	• Tug Zone	• Vessel

3.2 Service states

A service state expresses services (such as towage, pilotage etc.) requested by someone and to be supplied to someone and whether the message describes commencement or completion (c.f. figure 5). Agreements between actors are patterns of interaction constructed of requests, reception of requests, denials and confirmations between actors, as for example, pilot requested and pilot confirmed. The time sequence characteristics possible to express associated to service states are; requested, request received, denied, confirmed, commenced, and completed. In combination with the time type, the first four states will most likely be an actual time, as e.g. actual time of pilotage requested addressing which time the service is requested, request received for, denied, and confirmed. A service state is thus defined by a unique combination of service object and time sequence.

The location for where the service to be supplied is possible to specify, but optional. If the service implies a movement from one location to another, as in the case of pilotage and towage, it is possible to specify from which location ("from location") and to which location ("to location") the service is conducted. In the case of that it is relevant to specify where the service is to be/are being performed (not involving any movement) as in the case of arrival mooring operations and departure mooring operations, the "at location" is possible to use for specifying where the service is realized.

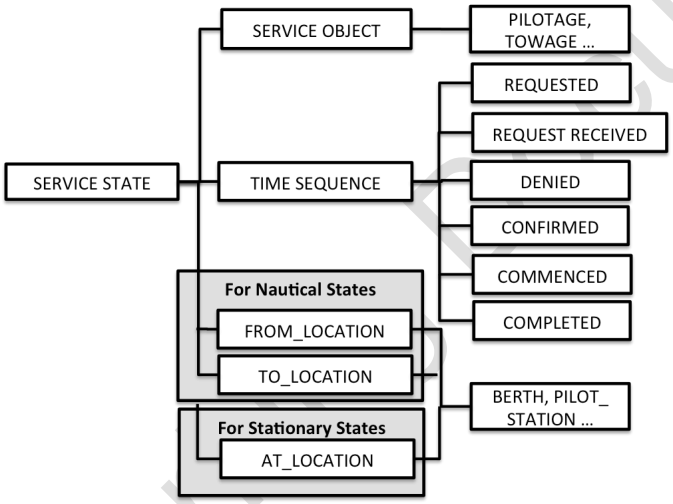

Figure 5: The constituents of a service state

The following service objects have so far been identified (extensible list for future versions of the port call message standard):

• Anchoring	• Gangway	• Security
• Arrival Mooring Operation	• Departure Moorers	• Arrival Moorers
• Berth Shifting	• Arrival Anchoring Operation	• Arrival Berth
• Departure Anchoring Operation	• Arrival PortArea	• VTSAreaEntry
• Departure PortArea	• Bunkering Operation	• Cargo Operation
• Departure Mooring Operation	• Departure Berth	• Garbage Operation
• Pilotage	• VTSAreaDepart	• Escort Towage
• Pilotboat	• IceBreaking Operation	• LubeOil Operation
• PostCargo Survey	• PreCargo Survey	• Pontoons & Fenders
• Towage	• Provision Operation	• Skilled worker
• Slop operation	• Sludge Operation	• Tours
• Forklift	• Water Operation	• Embarking

These different services are options dependent on the purpose of the call, the characteristics of the cargo, and particular port characteristics. As e.g. pre/port cargo operations survey is not applicable for all types of cargo. The list of possible service objects is thus dependent of the characteristics of the port call such as, type of vessel, and port characteristics.

3.3 Different time types

As indicated in figure 3, five time types are covered in the port call message standard. The five basic time types are defined as follows:

- TT – Targeted Time: The time **when a particular actor committed to** arrive at, or depart from, a certain location (location state) or initiate/complete a particular service (service state)[5].
- RT – Recommended Time: The time **recommended to another actor to** arrive at/depart from a certain location (location state) or initiate/complete a particular service (service state). Recommended times is used as a basis for changing targeted times.
- CT – Cancelled Time: The cancellation of a time stamp, as e.g. cancellation of an earlier targeted, recommended, or estimated time to arrive at/depart from a certain location (location state) or a particular service (service state).
- ET - Estimated Time: The time for **when a particular actor estimates to** (possibly based on calculations) arrive at, or depart from, a certain location (location state) or initiate/complete a particular service (service state). An estimated time is often made based on assumptions on forecasted circumstances (such as weather forecasts) and insights on other actors' estimations.
- AT – Actual Time: The time **when an actor** arrived at/departed from a certain location (location state) or initiated/completed a particular service (service state). The actual time is used for evaluation based on the actual occurrence related to planned and/or estimated times. Actual times can also be used for billing, logbooks and/or statements of facts.

4 STATES ASSOCIATED WITH THE DIFFERENT EVENTS

Each event is built upon the different states that are reached by different actions performed by involved actors. The actions are associated with different events. A composition of states is thus used to define a particular event. In the figure 6, different states associated with typical events are captured.

In order to support the coordination, states in different events are to be related to each other, as e.g. the state arrival_mooringOp_completed in the event *arrival berth* is a pre-condition for the state *cargoOp_commenced* in the event *cargo operations*.

[5]Within the ECDIS community (for navigational purposes), "planned time" (PTA) for arriving at a particular location (flowpoint) is used for expressing the targeted time. This means that PTA and TTA is used with the same meaning, but the TTA is used within the PortCDM community.

Event: Escort Towage
EscortTowage_Commenced
EscortTowage_Completed
EscortTowage_Confirmed
EscortTowage_Denied
EscortTowage_ReqReceived
EscortTowage_Requested
Departure_EscortTug_LOC
Departure_EscortTug_Vessel
Arrival_EscortTug_ETugZone
Arrival_EscortTug_TugZone
Arrival_Vessel_ETugZone
Departure_Vessel_ETugZone
Arrival_Vessel_LOC
Departure_Vessel_LOC

Event: Forklift
Forklift_Commenced
Forklift_Completed
Forklift_Confirmed
Forklift_Denied
Forklift_ReqReceived
Forklift_Requested

Event: Pontoons&Fenders
Pontoons_and_Fenders_Confirmed
Pontoons_and_Fenders_Denied
Pontoons_and_Fenders_ReqReceived
Pontoons_and_Fenders_Requested
Arrival_Pontoons&Fenders_Berth
Departure_Pontoons&Fenders_Berth

Sludge Event: Operation
SludgeOp_Commenced
SludgeOp_Completed
SludgeOp_Confirmed
SludgeOp_Denied
SludgeOp_ReqReceived
SludgeOp_Requested

Event: Slop Operation
SlopOp_Commenced
SlopOp_Completed
SlopOp_Confirmed
SlopOp_Denied
SlopOp_ReqReceived
SlopOp_Requested

Event: Water Operation
WaterOp_Commenced
WaterOp_Completed
WaterOp_Confirmed
WaterOp_Denied
WaterOp_ReqReceived
WaterOp_Requested

Event: Security
Security_Commenced
Security_Completed
Security_Confirmed
Security_Denied
Security_ReqReceived
Security_Requested
Arrival_Security_Berth
Departure_Security_Berth

Event: Embarking
Arrival_Passenger_Vessel

Event: Agent
Arrival_Agent_Berth
Departure_Agent_Berth

Event: Navigation

Event: Ice Breaking Operation
IceBreaking_Commenced
IceBreaking_Completed
IceBreaking_Confirmed
IceBreaking_Denied
IceBreaking_ReqReceived
IceBreaking_Requested
Arrival_IceBreaker_LOC
Arrival_IceBreaker_RendezvArea
Arrival_Vessel_RendezvArea
Departure_IceBreaker_LOC
Departure_IceBreaker_RendezvArea
Departure_IceBreaker_Vessel
Departure_Vessel_RendezvArea

Event: Towage
Towage_Commenced
Towage_Completed
Towage_Confirmed
Towage_Denied
Towage_ReqReceived
Towage_Requested
Arrival_Pilot_TugZone
Arrival_Tug_TugZone
Arrival_Vessel_TugZone
Departure_Tug_LOC
Departure_Tug_Vessel
Arrival_Tug_Berth
Departure_Vessel_TugZone

Event: Skilled Worker
SkilledWorker_Confirmed
SkilledWorker_Denied
SkilledWorker_ReqReceived
SkilledWorker_Requested
Arrival_SkilledWorker_Berth

Event: Arrival Anchorage Area
ArrivalAnchoringOp_Commenced
ArrivalAnchoringOp_Completed
ArrivalAnchoringOp_Confirmed
ArrivalAnchoringOp_Denied
ArrivalAnchoringOp_ReqReceived
ArrivalAnchoringOp_Requested
Anchoring_Commenced
Arrival_Vessel_AnchorageArea

Event: Departure Anchorage Area
Anchoring_Completed
DepartureAnchoringOp_Commenced
DepartureAnchoringOp_Completed
DepartureAnchoringOp_Confirmed
DepartureAnchoringOp_Denied
DepartureAnchoringOp_ReqReceived
DepartureAnchoringOp_Requested
Departure_Vessel_AnchorageArea

Event: Arrival Berth
BerthVisit_Confirmed
BerthVisit_Denied
BerthVisit_ReqReceived
BerthVisit_Requested
Arrival_Vessel_Berth

Event: Departure Port Area
PortDeparture_Confirmed
PortDeparture_Denied
PortDeparture_ReqReceived
PortDeparture_Requested
VTSAreaDepart_Confirmed
VTSAreaDepart_Denied
VTSAreaDepart_ReqReceived
VTSAreaDepart_Requested
Departure_Vessel_TrafficArea

Event: Bunkering Operation
Bunkering_Commenced
Bunkering_Completed
Bunkering_Confirmed
Bunkering_Denied
Bunkering_ReqReceived
Bunkering_Requested

Event: Arrival Port Area
Arrival_Vessel_TrafficArea
PortVisit_Confirmed
PortVisit_Denied
PortVisit_ReqReceived
PortVisit_Requested
VTSAreaEntry_Confirmed
VTSAreaEntry_Denied
VTSAreaEntry_ReqReceived
VTSAreaEntry_Requested

Event: Arrival Next Port
Arrival_Vessel_TrafficArea

Event: Departure Previous Port
Departure_Vessel_TrafficArea

Event: Cargo Operation
PreCargoSurvey_Commenced
PreCargoSurvey_Completed
PreCargoSurvey_Confirmed
PreCargoSurvey_Denied
PreCargoSurvey_ReqReceived
PreCargoSurvey_Requested
CargoOp_Commenced
CargoOp_Completed
CargoOp_Confirmed
CargoOp_Denied
CargoOp_ReqReceived
CargoOp_Requested
PostCargoSurvey_Commenced
PostCargoSurvey_Completed
PostCargoSurvey_Confirmed
PostCargoSurvey_Denied
PostCargoSurvey_ReqReceived
PostCargoSurvey_Requested

Event: Berth Shifting
BerthShifting_Commenced
BerthShifting_Completed
BerthShifting_Confirmed
BerthShifting_Denied
BerthShifting_ReqReceived
BerthShifting_Requested

Event: Departure Berth
BerthDeparture_Confirmed
BerthDeparture_Denied
BerthDeparture_ReqReceived
BerthDeparture_Requested
ReadyToSailOp_Commenced
ReadyToSailOp_Completed
Departure_Vessel_Berth

Event: Departure Mooring Operation
Departure_moorers _Confirmed
Departure_moorers_Denied
Departure_moorers_ReqReceived
Departure_moorers_Requested
DepartureMooringOp_Commenced
DepartureMooringOp_Completed
DepartureMooringOp_Confirmed
DepartureMooringOp_Denied
DepartureMooringOp_ReqReceived
DepartureMooringOp_Requested
Arrival_DepartureMoorers_Berth
Departure_DepartureMoorers_Berth

Event: Gangway
Gangway_Confirmed
Gangway_Denied
Gangway_ReqReceived
Gangway_Requested
Departure_Gangway_Berth
Arrival_Gangway_Berth

Event: Pilotage
Pilotage_Commenced
Pilotage_Completed
Pilotage_confirmed
Pilotage_Denied
Pilotage_ReqReceived
Pilotage_requested
PliotBoat_confirmed
PliotBoat_Denied
PliotBoat_ReqReceived
PliotBoat_requested
Departure_Vessel_PilotBA
Departure_PilotBoat_LOC
Departure_Pilot_Vessel
Arrival_Vessel_PilotBA
Arrival_Pilot_PilotBA
Arrival_Pilot_Vessel
Arrival_Pilot_Berth
Arrival_PilotBoat_PilotBA

Event: Garbage Operation
GarbageOp_Commenced
GarbageOp_Completed
GarbageOp_Confirmed
GarbageOp_Denied
GarbageOp_ReqReceived
GarbageOp_Requested

Event: Lubeoil Operation
LubeOil_Commenced
LubeOil_Completed
LubeOil_Confirmed
LubeOil_Denied
LubeOil_ReqReceived
LubeOil_Requested

Event: Provision Operation
Provision_Commenced
Provision_Completed
Provision_Confirmed
Provision_Denied
Provision_ReqReceived
Provision_Requested

Event: Tours
Tours_Commenced
Tours_Completed
Tours_Confirmed
Tours_Denied
Tours_ReqReceived
Tours_Requested

Event: Arrival Mooring Operation
Arrival_moorers _Confirmed
Arrival_moorers_Denied
Arrival_moorers_ReqReceived
Arrival_moorers_Requested
ArrivalMooringOp_commenced
ArrivalMooringOp_completed
ArrivalMooringOp_Confirmed
ArrivalMooringOp_Denied
ArrivalMooringOp_ReqReceived
ArrivalMooringOp_Requested
Arrival_ArrivalMoorers_Berth
Departure_ArrivalMoorers_Berth

Figure 6: States associated with events

5 SUMMARY – THE CONSTITUENTS OF THE PORT CALL PROCESS

To summarize, the port call process is a complex sequence of activities, some optional and some mandatory, and some sets of sequences possibly repeated. However, the more information about states, the better possibility to coordinate for the purpose of optimization and synchronization. Thus, it needs to be captured on different levels of granularity to provide complete operational support. A layered model has therefore informed the composition of a port call message standard. The basic unit of analysis is the time stamp. A combination of states characterizes an event and a sub-process is compound of one or several events. In figure 7, these layers (including instances) are captured.

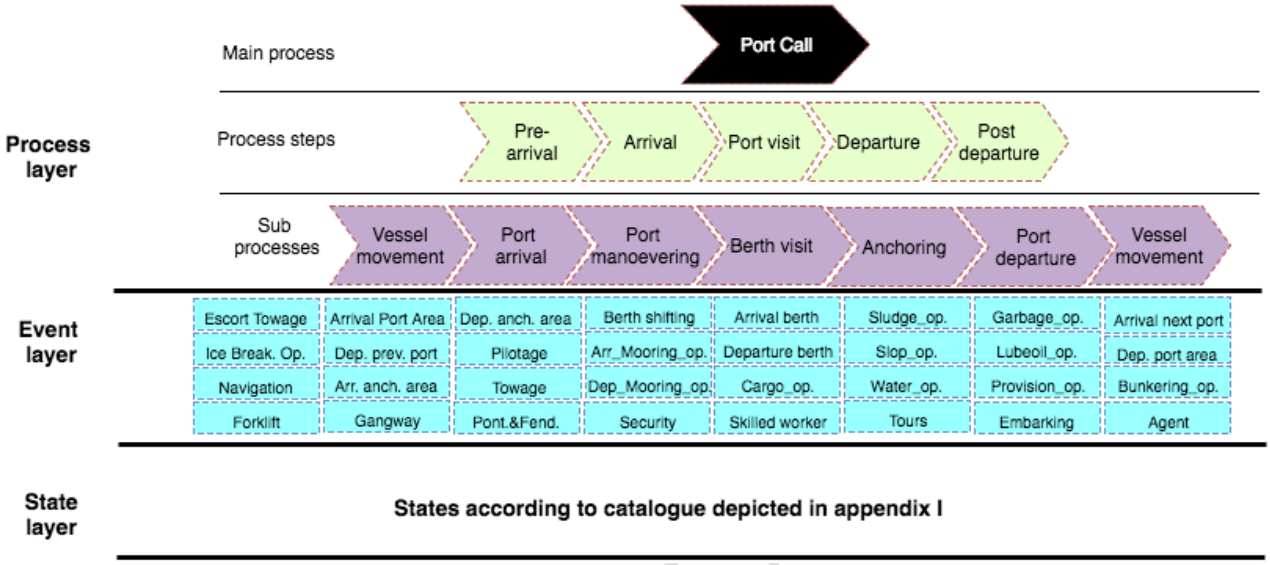

Figure 7: Layered model constituting the port call process

To be noted is that there might be several different events (service objects) applicable for different purposes of the call. Examples of such events would be bunkering, repairs, waste/garbage disposal, supplies/provision, sloop operations, sludge operations, water supply, as well as formalities (customs, immigration, health inspections etc.). All of these are not yet covered, i.e. there is room for extension of the standard. The port call message standard allows for bringing in new service object adapted to different purposes of calls and to different port needs. Such service objects would then follow patterns of requested-request received-denied-confirmed-commenced-completed.

6 INFORMATION MODEL AND XML-SCHEMA

6.1 Information Model

PortCall is the central object in the port call information model (c.f. figure 8). A PortCall encapsulates the data related to one **Vessel**'s visit to one **Port** as part of one inbound **Voyage** and one (optional) outbound voyage dependent on if the voyage is concluded in the port call. This means that a voyage could refer any number of port calls, i.e. two or more dependent if the same voyage includes one or several port calls, and a port call could refer to one or two voyages. At the Destination PortCall of a Voyage, this Voyage is the inbound Voyage of the PortCall. This PortCall will become the departing PortCall of a new outbound Voyage.

The Vessel, Port and Voyage entities are assumed to be part of, and defined in, the sea traffic management (STM) information domain (indicated by the <<STM>> stereotype). The PortCall entity might also be part of the STM information domain, but shall at least have a unique STM identifier—port call messages, carrying data about a port call must provide the port call identifier as means of identifying the port call for which the data applies. It is further assumed that **Location** is part of the STM information domain, keeping a registry of all valid locations, including ports, and the relevant locations within a port (e.g. rendezvous point, anchoring areas, and quays).

Port call data are encapsulated in a number of abstractions. The top level abstraction is the **ProcessStep**, which represents overarching port call phases (referred to as process steps in section 3 above) currently envisioned to be: Pre-Arrival, Arrival, Port visit, Departure, and Post-departure. A ProcessStep is further subdivided into **SubProcess** entities, where a SubProcess represents a set of related events. An example of a SubProcess instance is port manoeuvring, i.e. taking the vessel from an anchoring zone to berth, or between quays. A SubProcess entity is subdivided into **Event** instances, where an Event represents a small and coherent unit of work. Examples of typical events are pilotage, towage, cargo operations, arrival berth, departure berth, arrival port area, and departure port area. An Event, in turn, comprises **State** instances. A State represents a progress (or state) of a specific operation. The progress of an operation is chosen carefully such that it carries important properties for synchronizing and evaluating overall port call progress, and for planning future operations. Typical examples of State instances are: arrival vessel to traffic area (Arrival_Vessel_TrafficArea) (i.e. to the port area), cargo operations completed (CargoOp_Completed), and towage commenced (Towage_Commenced). Following the nomenclature discussed in section 3, concrete instances of a State can be either a **LocationState** or a **ServiceState** is depicted in the model.

A **LocationState** represents a reference object's arrival to, or departure from (controlled by the type **LocationTimeSequence**), a specific location.

A **ServiceState** represents the progress of a service object (controlled by the type **ServiceTimeSequence**), such as cargo operations commenced or towage completed. The abstract ServiceState is specialized into either **NauticalServiceState** or **StationaryServiceState** depending on whether the service concerns movement (from one location to another, e.g. towage) or is performed at a specified location (e.g bunkering or cargo operations). Performing actor is also captured for service states.

Finally, a State may contain any number of **Statement** instances. Together with **LocationState** and **ServiceState**, **Statement** dictates content and structure of the Port Call Message format. A Statement represents a reported data point, and corresponds directly to exactly one message in the Port Call Messaging format. A Statement comprises a stated time (timeStatement) and a specification of the meaning of that time (controlled by the type TimeType). For instance, providing an estimated time for the State 'arrival_vessel_trafficarea' with the TimeType ESTIMATED would mean an estimation of when the vessel will arrive to the port. In addition, a Statement comprises statement meta-data (which **Actor** reported the data, and at which time) as well as a free text comment.

In addition to the information model described above, the **StateDefinition** entity represents a valid PortCDM state. While combining elements of the Port Call Message format may produce any number of possible States, only a subset of these is considered valid within PortCDM (an initial set is shown in the port call metro map metaphor). It is envisioned that a standardized **State Catalogue** defines the set of valid PortCDM states in terms of StateDefinition instances. A StateDefinition shall comprise at least an identifier, a name/description together with the Port Call Message (PCM) format elements that define it. Example StateDefinition instances may be defined as:

ID: *Arrival_Vessel_TrafficArea*
Name: *Vessel arrival to traffic area*
PCM definition: **Type**: *LocationState*,
ReferenceObject=*VESSEL*, **TimeSequence**=*ARRIVAL_TO*, **Location**=*TRAFFICAREA*

ID: CargoOp_Commenced
Name: *Cargo operations Commenced*
PCM definition: **Type**: *StationaryServiceState*,
ServiceObject=CARGO_OPERATION, **TimeSequence**=*COMMENCED*

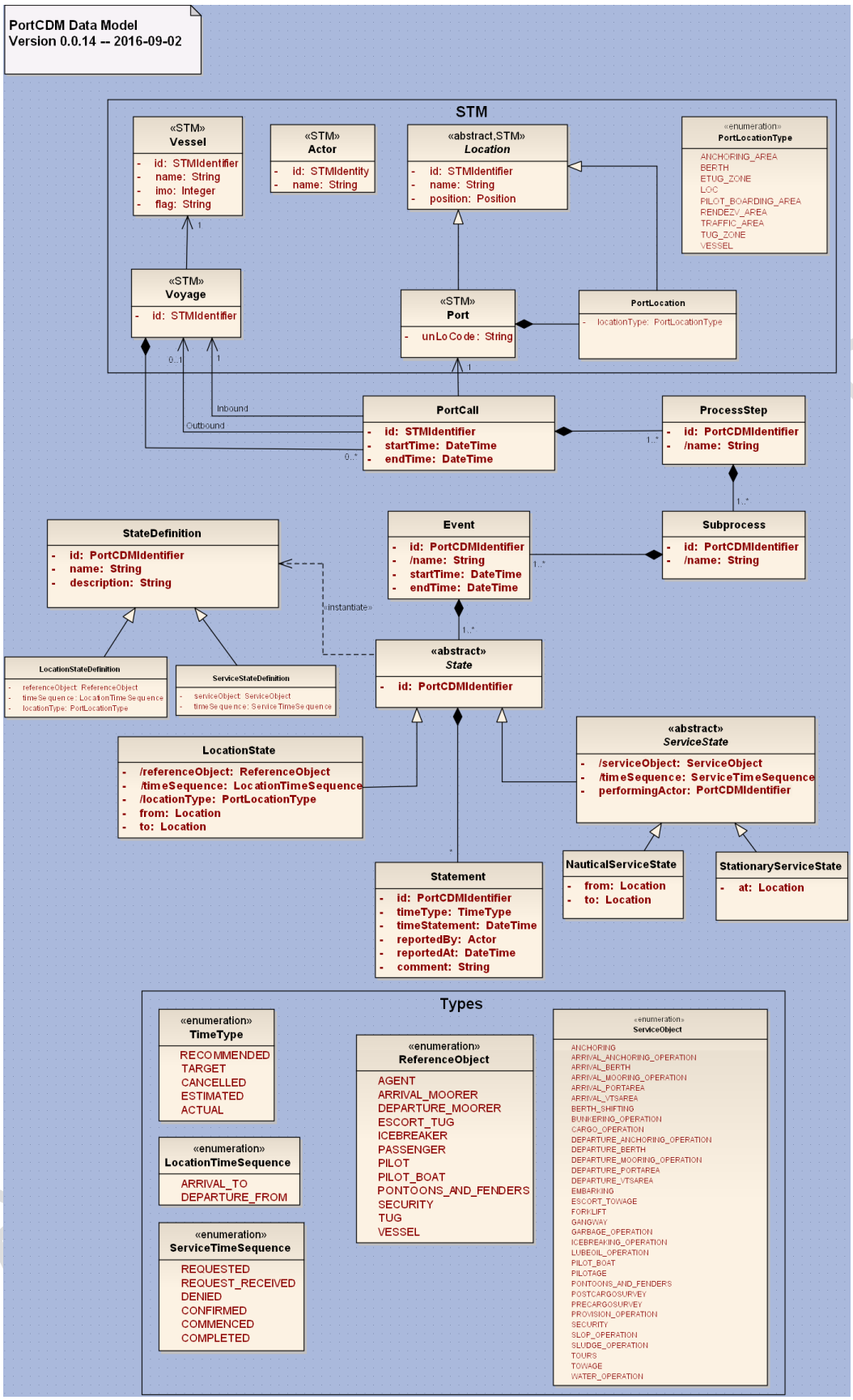

Figure 8: PortCDM Information Model (version 0.0.14 2016-09-02).

6.2 XML Schema and schema definition

This section describes the technical implementation of a port call message. While port call messages are represented by the Statement class in the port call information model, parts of the message elements are

held by the State class to which the Statement belongs; for instance: ReferenceObject, TimeSequence and Location. Such elements determine to which StateDefinition the implied Statement belongs. Thus, in relation to the Port Call information model, a port call message carry in addition to the reported time and related meta-data, certain information regarding which State the reported time concerns, and thereby implicitly also the type of event. Identification of the more abstract entities in the information model (as well as the individual State and Event instances) will require algorithmic solutions.

The technical implementation for Port Call Message Format is described as an XML Schema (see figure 9 and appendix II for schema definition) to facilitate an unambiguous representation of the format that allows implementation in a range of different software environments in a consistent manner. A few additions and adaptations stemming from the nature of XML schemas and simple convenience of usage that are worth noting:

- LocationState has no explicit element holding the time sequence. Instead, this is expressed as a choice between two similar elements, arrivalLocation and departureLocation. Any LocationState must contain exactly one element, either an arrivalLocation or a departureLocation. Designing it this way lets us impose a specific rule that makes ”from” optional for an arrivalLocation and ”to” optional for a departureLocation[6]
- messageId is based on UUID in URN format, in accordance with RFC 4122[7]. This allows us to assign messageIds in a distributed manner with no centralised id management and still be guaranteed that all messageIds are globally unique. As a result, any message that is sent has an Id
- groupWith is a messageId pointing to another, previously sent message that holds information that refers to a related data point. This facilitates good algorithmical identification of related messages, pertaining to, for instance, the same berth shifting event. The field is optional.

Location, the type that holds information about the actual locations for LocationStates have three identifying fields:

- name, which is a logical location, in the sense that it identifies a location as being a quay, pilot station or anchoring area. This is the only mandatory field
- identity points to a specific instance of a logical location. This can be a quay number, the name of a specific anchoring area or similar.
- Position is the geographical position of the location. Mainly intended for locations that are not geographically fixed over time, such as a specific rendezvous point between vessel and pilot.

[6] Example showing two LocationState elements, one for TimeSequence ARRIVAL and one for TimeSequence DEPARTURE. In both cases the optional element to and from, respectively, are included and commented as being optional

```
<pcm:locationState>
  <pcm:arrivalLocation>
    <!--Optional:-->
    <pcm:from>
      <pcm:name>BERTH</pcm:name>
    </pcm:from>
    <pcm:to>
      <pcm:name>ANCHORAGE_AREA</pcm:name>
    </pcm:to>
  </pcm:arrivalLocation>
</pcm:locationState>

<pcm:locationState>
  <pcm:departureLocation>
    <pcm:from>
      <pcm:name>ANCHORAGE_AREA</pcm:name>
    </pcm:from>
    <!--Optional:-->
    <pcm:to>
      <pcm:name>TUG_STATION</pcm:name>
    </pcm:to>
  </pcm:departureLocation>
</pcm:locationState>
```

[7] www.ietf.org/rfc/rfc4122.txt

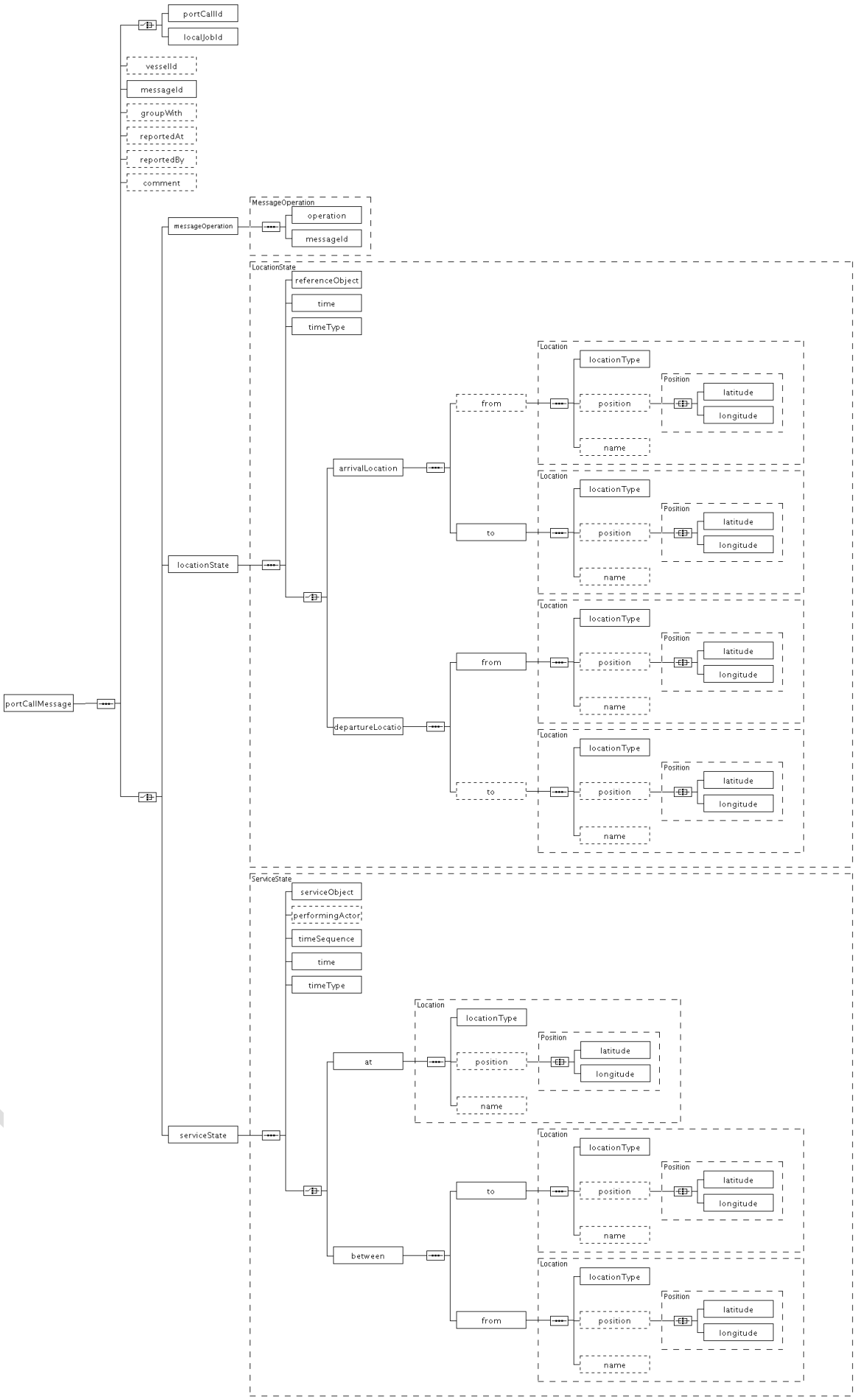

Figure 9: XML-schema (ver 0.0.15)

7 ACKNOWLEDGEMENT

This version 0.5 of the Port Call Message Standard is a further refinement of the Port Call Message Standard 0.42 issued in the spring of 2016[8]. The refinement has been informed by experiences from putting the standard into use in multiple instances. The refinement to this version has been a collaborative effort between Mikael Lind, Sandra Haraldson, Almir Zerem, Mathias Karlsson, Niklas Mellegård, Eddie Olsson, Robert Rylander (Viktoria Swedish ICT), Mikael Hägg (Swedish Maritime Administration), Sean Deehan, Gabriel Ferrús Clari, and José Andrés Giménez Maldonado (ValenciaPort Foundation).

8 ACTION REQUESTED OF THE COMMITTEE

The Committee is requested to note the information and take appropriate action.

[8] Lind M., Haraldson S. et al (2016) Port Call Message Standard, version 0.42, STM Validation Project

APPENDIX I: STATE CATALOGUE FOR LOCATION AND SERVICE STATES

State Id	Time Sequence	Reference Object	Location type	Name
Arrival_Agent_Berth	ARRIVAL_TO	AGENT	BERTH	Arrival Agent Berth
Arrival_ArrivalMoorers_Berth	ARRIVAL_TO	ARRIVAL_MOORER	BERTH	Arrival ArrivalMoorer Berth
Arrival_DepartureMoorers_Berth	ARRIVAL_TO	DEPARTURE_MOORER	BERTH	Arrival DepartureMoorer Berth
Arrival_EscortTug_ETugZone	ARRIVAL_TO	ESCORT_TUG	ETUG_ZONE	Arrival EscortTug EscortTugZone
Arrival_EscortTug_TugZone	ARRIVAL_TO	ESCORT_TUG	TUG_ZONE	Arrival EscortTug Tug zone
Arrival_Gangway_Berth	ARRIVAL_TO	GANGWAY	BERTH	Arrival Gangway Berth
Arrival_IceBreaker_LOC	ARRIVAL_TO	ICEBREAKER	LOC	Arrival IceBreaker LOC
Arrival_IceBreaker_RendezvArea	ARRIVAL_TO	ICEBREAKER	RENDEZV_AREA	Arrival IceBreaker Rendezvous Area
Arrival_Passenger_Vessel	ARRIVAL_TO	PASSENGER	VESSEL	Arrival Passenger Vessel
Arrival_Pilot_Berth	ARRIVAL_TO	PILOT	BERTH	Arrival Pilot Berth
Arrival_Pilot_PilotBA	ARRIVAL_TO	PILOT	PILOT_BOARDING_AREA	Arrival Pilot PilotBoardingArea
Arrival_Pilot_TugZone	ARRIVAL_TO	PILOT	TUG_ZONE	Arrival Pilot TugZone
Arrival_Pilot_Vessel	ARRIVAL_TO	PILOT	VESSEL	Arrival Pilot Vessel
Arrival_PilotBoat_PilotBA	ARRIVAL_TO	PILOT_BOAT	PILOT_BOARDING_AREA	Arrival Pilotboat PilotBoardingArea
Arrival_Pontoons&Fenders_Berth	ARRIVAL_TO	PONTOONS_AND_FENDERS	BERTH	Arrival Pontoons&Fenders Berth
Arrival_Security_Berth	ARRIVAL_TO	SECURITY	BERTH	Arrival Security Berth
Arrival_SkilledWorker_Berth	ARRIVAL_TO	SKILLED_WORKER	BERTH	Arrival SkilledWorker Berth
Arrival_Tug_Berth	ARRIVAL_TO	TUG	BERTH	Arrival Tug Berth
Arrival_Tug_TugZone	ARRIVAL_TO	TUG	TUG_ZONE	Arrival Tug TugZone
Arrival_Vessel_AnchorageArea	ARRIVAL_TO	VESSEL	ANCHORING_AREA	Arrival Vessel Anchoring Area
Arrival_Vessel_Berth	ARRIVAL_TO	VESSEL	BERTH	Arrival Vessel Berth
Arrival_Vessel_ETugZone	ARRIVAL_TO	VESSEL	ETUG_ZONE	Arrival Vessel EscortTugZone
Arrival_Vessel_LOC	ARRIVAL_TO	VESSEL	LOC	Arrival Vessel LOC
Arrival_Vessel_PilotBA	ARRIVAL_TO	VESSEL	PILOT_BOARDING_AREA	Arrival Vessel PilotBoardingArea
Arrival_Vessel_RendezvArea	ARRIVAL_TO	VESSEL	RENDEZV_AREA	Arrival Vessel Rendezvous Area
Arrival_Vessel_TrafficArea	ARRIVAL_TO	VESSEL	TRAFFIC_AREA	Arrival Vessel Traffic Area
Arrival_Vessel_TugZone	ARRIVAL_TO	VESSEL	TUG_ZONE	Arrival Vessel TugZone
Departure_Agent_Berth	DEPARTURE_FROM	AGENT	BERTH	Departure Agent Berth
Departure_ArrivalMoorers_Berth	DEPARTURE_FROM	ARRIVAL_MOORER	BERTH	Departure ArrivalMoorers Berth
Departure_DepartureMoorers_Berth	DEPARTURE_FROM	DEPARTURE_MOORER	BERTH	Departure DepartureMoorers Berth
Departure_EscortTug_LOC	DEPARTURE_FROM	ESCORT_TUG	LOC	Departure Escort Tug LOC
Departure_EscortTug_Vessel	DEPARTURE_FROM	ESCORT_TUG	VESSEL	Departure Escort Tug Vessel
Departure_Gangway_Berth	DEPARTURE_FROM	GANGWAY	BERTH	Departure Gangway Berth
Departure_IceBreaker_LOC	DEPARTURE_FROM	ICEBREAKER	LOC	Departure IceBreaker LOC
Departure_IceBreaker_RendezvArea	DEPARTURE_FROM	ICEBREAKER	RENDEZV_AREA	Departure Rendezvous Area
Departure_IceBreaker_Vessel	DEPARTURE_FROM	ICEBREAKER	VESSEL	Departure IceBreaker Vessel
Departure_Pilot_Vessel	DEPARTURE_FROM	PILOT	VESSEL	Pilot Vessel Departed
Departure_PilotBoat_LOC	DEPARTURE_FROM	PILOT_BOAT	LOC	Departure PilotBoat LOC
Departure_Pontoons&Fenders_Berth	DEPARTURE_FROM	PONTOONS_AND_FENDERS	BERTH	Departure Pontoons&Fenders Berth
Departure_Security_Berth	DEPARTURE_FROM	SECURITY	BERTH	Departure Security Berth
Departure_Tug_LOC	DEPARTURE_FROM	TUG	LOC	Departure Tug LOC
Departure_Tug_Vessel	DEPARTURE_FROM	TUG	VESSEL	Departure Tug Vessel
Departure_Vessel_AnchorageArea	DEPARTURE_FROM	VESSEL	ANCHORING_AREA	Departure Vessel Anchoring Area
Departure_Vessel_Berth	DEPARTURE_FROM	VESSEL	BERTH	Departure Vessel Berth
Departure_Vessel_ETugZone	DEPARTURE_FROM	VESSEL	ETUG_ZONE	Departure Vessel Escort Tug zone
Departure_Vessel_LOC	DEPARTURE_FROM	VESSEL	LOC	Departure Vessel LOC
Departure_Vessel_PilotBA	DEPARTURE_FROM	VESSEL	PILOT_BOARDING_AREA	Departure Vessel PilotBoardingArea
Departure_Vessel_RendezvArea	DEPARTURE_FROM	VESSEL	RENDEZV_AREA	Departure Rendezvous Area
Departure_Vessel_TrafficArea	DEPARTURE_FROM	VESSEL	TRAFFIC_AREA	Departure Vessel TrafficArea
Departure_Vessel_TugZone	DEPARTURE_FROM	VESSEL	TUG_ZONE	Departure Vessel TugZone

Figure 10: Definition of location states

State Id	Service type	Service object	Time Sequence	Name
Anchoring_Commenced	STATIONARY	ANCHORING	COMMENCED	Anchoring Commenced
Anchoring_Completed	STATIONARY	ANCHORING	COMPLETED	Anchoring Completed
Arrival_moorers _Confirmed	STATIONARY	ARRIVAL_MOORERS	CONFIRMED	Arrival Moorers confirmed
Arrival_moorers_Denied	STATIONARY	ARRIVAL_MOORERS	DENIED	Arrival Moorers Denied
Arrival_moorers_ReqReceived	STATIONARY	ARRIVAL_MOORERS	REQUEST_RECEIVED	Arrival Moorers Request Received
Arrival_moorers_Requested	STATIONARY	ARRIVAL_MOORERS	REQUESTED	Arrival Moorers Requested
ArrivalMooringOp_commenced	STATIONARY	ARRIVAL_MOORING_OPERATION	COMMENCED	Arrival Mooring Operation Commenced
ArrivalMooringOp_completed	STATIONARY	ARRIVAL_MOORING_OPERATION	COMPLETED	Arrival Mooring Operation Completed
ArrivalMooringOp_Confirmed	STATIONARY	ARRIVAL_MOORING_OPERATION	CONFIRMED	Arrival Mooring Operation Confirmed
ArrivalMooringOp_Denied	STATIONARY	ARRIVAL_MOORING_OPERATION	DENIED	Arrival Mooring Operation Denied
ArrivalMooringOp_ReqReceived	STATIONARY	ARRIVAL_MOORING_OPERATION	REQUEST_RECEIVED	Arrival Mooring Operation Request Received
ArrivalMooringOp_Requested	STATIONARY	ARRIVAL_MOORING_OPERATION	REQUESTED	Arrival Mooring Operation Requested
ArrivalAnchoringOp_Commenced	STATIONARY	ARRIVAL_ANCHORING_OPERATION	COMMENCED	Arrival Anchoring Operation Commenced
ArrivalAnchoringOp_Completed	STATIONARY	ARRIVAL_ANCHORING_OPERATION	COMPLETED	Arrival Anchoring Operation Completed
ArrivalAnchoringOp_Confirmed	STATIONARY	ARRIVAL_ANCHORING_OPERATION	CONFIRMED	Arrival Anchoring Operation Confirmed
ArrivalAnchoringOp_Denied	STATIONARY	ARRIVAL_ANCHORING_OPERATION	DENIED	Arrival Anchoring Operation Denied
ArrivalAnchoringOp_ReqReceived	STATIONARY	ARRIVAL_ANCHORING_OPERATION	REQUEST_RECEIVED	Arrival Anchoring Operation Request Received
ArrivalAnchoringOp_Requested	STATIONARY	ARRIVAL_ANCHORING_OPERATION	REQUESTED	Arrival Anchoring Operation Requested
BerthDeparture_Confirmed	STATIONARY	DEPARTURE_BERTH	CONFIRMED	Departure Vessel Berth Confirmed
BerthDeparture_Denied	STATIONARY	DEPARTURE_BERTH	DENIED	Departure Vessel Berth Request Denied
BerthDeparture_ReqReceived	STATIONARY	DEPARTURE_BERTH	REQUEST_RECEIVED	Departure Vessel Berth Request Received
BerthDeparture_Requested	STATIONARY	DEPARTURE_BERTH	REQUESTED	Departure Vessel Berth Requested
BerthShifting_Commenced	NAUTICAL	BERTH_SHIFTING	COMMENCED	Besth Shifting Commenced
BerthShifting_Completed	NAUTICAL	BERTH_SHIFTING	COMPLETED	Besth Shifting Completed
BerthShifting_Confirmed	NAUTICAL	BERTH_SHIFTING	CONFIRMED	Besth Shifting Confirmed
BerthShifting_Denied	NAUTICAL	BERTH_SHIFTING	DENIED	Berth Shifting Denied
BerthShifting_ReqReceived	NAUTICAL	BERTH_SHIFTING	REQUEST_RECEIVED	Berth Shifting Request Received
BerthShifting_Requested	NAUTICAL	BERTH_SHIFTING	REQUESTED	Berth Shifting Requested

Figure 11: Definition of service states - part 1

State Id	Service type	Service object	Time Sequence	Name
BerthVisit_Confirmed	STATIONARY	ARRIVAL_BERTH	CONFIRMED	Arrival Vessel Berth Confirmed
BerthVisit_Denied	STATIONARY	ARRIVAL_BERTH	DENIED	Arrival Vessel Berth Request Denied
BerthVisit_ReqReceived	STATIONARY	ARRIVAL_BERTH	REQUEST_RECEIVED	Arrival Vessel Berth Request Received
BerthVisit_Requested	STATIONARY	ARRIVAL_BERTH	REQUESTED	Arrival Vessel Berth Requested
Bunkering_Commenced	STATIONARY	BUNKERING_OPERATION	COMMENCED	Bunkering Operation Commenced
Bunkering_Completed	STATIONARY	BUNKERING_OPERATION	COMPLETED	Bunkering Operation Completed
Bunkering_Confirmed	STATIONARY	BUNKERING_OPERATION	CONFIRMED	Bunkering Operation Confirmed
Bunkering_Denied	STATIONARY	BUNKERING_OPERATION	DENIED	Bunkering Operation Request Denied
Bunkering_ReqReceived	STATIONARY	BUNKERING_OPERATION	REQUEST_RECEIVED	Bunkering Operation Request Received
Bunkering_Requested	STATIONARY	BUNKERING_OPERATION	REQUESTED	Bunkering Operation Requested
CargoOp_Commenced	STATIONARY	CARGO_OPERATION	COMMENCED	Cargo Operations Commenced
CargoOp_Completed	STATIONARY	CARGO_OPERATION	COMPLETED	Cargo Operations Completed
CargoOp_Confirmed	STATIONARY	CARGO_OPERATION	CONFIRMED	Cargo Operations Confirmed
CargoOp_Denied	STATIONARY	CARGO_OPERATION	DENIED	Cargo Operations Request Denied
CargoOp_ReqReceived	STATIONARY	CARGO_OPERATION	REQUEST_RECEIVED	Cargo Operations Request Received
CargoOp_Requested	STATIONARY	CARGO_OPERATION	REQUESTED	Cargo Operations Requested
Departure_moorers _Confirmed	STATIONARY	DEPARTURE_MOORERS	CONFIRMED	Departure Moorers Confirmed
Departure_moorers_Denied	STATIONARY	DEPARTURE_MOORERS	DENIED	Departure Moorers Denied
Departure_moorers_ReqReceived	STATIONARY	DEPARTURE_MOORERS	REQUEST_RECEIVED	Departure Moorers Request Received
Departure_moorers_Requested	STATIONARY	DEPARTURE_MOORERS	REQUESTED	Departure Moorers Requested
DepartureMooringOp_Commenced	STATIONARY	DEPARTURE_MOORING_OPERATION	COMMENCED	Departure Mooring Operation Commenced
DepartureMooringOp_Completed	STATIONARY	DEPARTURE_MOORING_OPERATION	COMPLETED	Departure Mooring Operation Completed
DepartureMooringOp_Confirmed	STATIONARY	DEPARTURE_MOORING_OPERATION	CONFIRMED	Departure Mooring Operation Confirmed
DepartureMooringOp_Denied	STATIONARY	DEPARTURE_MOORING_OPERATION	DENIED	Departure Mooring Operation Denied
DepartureMooringOp_ReqReceived	STATIONARY	DEPARTURE_MOORING_OPERATION	REQUEST_RECEIVED	Departure Mooring Operation Request Received
DepartureMooringOp_Requested	STATIONARY	DEPARTURE_MOORING_OPERATION	REQUESTED	Departure Mooring Operation Requested
DepartureAnchoringOp_Commenced	STATIONARY	DEPARTURE_ANCHORING_OPERATION	COMMENCED	Departure Anchoring Operation Commenced
DepartureAnchoringOp_Completed	STATIONARY	DEPARTURE_ANCHORING_OPERATION	COMPLETED	Departure Anchoring Operation Completed
DepartureAnchoringOp_Confirmed	STATIONARY	DEPARTURE_ANCHORING_OPERATION	CONFIRMED	Departure Anchoring Operation Confirmed
DepartureAnchoringOp_Denied	STATIONARY	DEPARTURE_ANCHORING_OPERATION	DENIED	Departure Anchoring Operation Denied
DepartureAnchoringOp_ReqReceived	STATIONARY	DEPARTURE_ANCHORING_OPERATION	REQUEST_RECEIVED	Departure Anchoring Operation Request Received
DepartureAnchoringOp_Requested	STATIONARY	DEPARTURE_ANCHORING_OPERATION	REQUESTED	Departure Anchoring Operation Requested
EscortTowage_Commenced	NAUTICAL	ESCORT_TOWAGE	COMMENCED	Escort Towage Commenced
EscortTowage_Completed	NAUTICAL	ESCORT_TOWAGE	COMPLETED	Escort Towage Completed
EscortTowage_Confirmed	NAUTICAL	ESCORT_TOWAGE	CONFIRMED	Escort Towage Confirmed
EscortTowage_Denied	NAUTICAL	ESCORT_TOWAGE	DENIED	Escort Towage Request Denied
EscortTowage_ReqReceived	NAUTICAL	ESCORT_TOWAGE	REQUEST_RECEIVED	Escort Towage Request Received
EscortTowage_Requested	NAUTICAL	ESCORT_TOWAGE	REQUESTED	Escort Towage Requested
Forklift_Commenced	STATIONARY	FORKLIFT	COMMENCED	Forklift Commenced
Forklift_Completed	STATIONARY	FORKLIFT	COMPLETED	Forklift Completed
Forklift_Confirmed	STATIONARY	FORKLIFT	CONFIRMED	Forklift Confirmed
Forklift_Denied	STATIONARY	FORKLIFT	DENIED	Forklift Denied
Forklift_ReqReceived	STATIONARY	FORKLIFT	REQUEST_RECEIVED	Forklift Request Received
Forklift_Requested	STATIONARY	FORKLIFT	REQUESTED	Forklft Requested
Gangway_Confirmed	STATIONARY	GANGWAY	CONFIRMED	Gangway Confirmed
Gangway_Denied	STATIONARY	GANGWAY	DENIED	Gangway Denied
Gangway_ReqReceived	STATIONARY	GANGWAY	REQUEST_RECEIVED	Gangway Request Received
Gangway_Requested	STATIONARY	GANGWAY	REQUESTED	Gangway Requested
GarbageOp_Commenced	STATIONARY	GARBAGE_OPERATION	COMMENCED	Garbage Operation Commenced
GarbageOp_Completed	STATIONARY	GARBAGE_OPERATION	COMPLETED	Garbage Operation Completed
GarbageOp_Confirmed	STATIONARY	GARBAGE_OPERATION	CONFIRMED	Garbage Operation Confirmed
GarbageOp_Denied	STATIONARY	GARBAGE_OPERATION	DENIED	Garbage Operation Request Denied
GarbageOp_ReqReceived	STATIONARY	GARBAGE_OPERATION	REQUEST_RECEIVED	Garbage Operation Request Received
GarbageOp_Requested	STATIONARY	GARBAGE_OPERATION	REQUESTED	Garbage Operation Requested
IceBreaking_Commenced	NAUTICAL	ICEBREAKING_OPERATION	COMMENCED	IceBreaker Assistance Commenced
IceBreaking_Completed	NAUTICAL	ICEBREAKING_OPERATION	COMPLETED	IceBreaker Assistance Completed
IceBreaking_Confirmed	NAUTICAL	ICEBREAKING_OPERATION	CONFIRMED	IceBreaker Assistance Confirmed
IceBreaking_Denied	NAUTICAL	ICEBREAKING_OPERATION	DENIED	IceBreaker Assistance Request Denied
IceBreaking_ReqReceived	NAUTICAL	ICEBREAKING_OPERATION	REQUEST_RECEIVED	IceBreaker Assistance Request Received
IceBreaking_Requested	NAUTICAL	ICEBREAKING_OPERATION	REQUESTED	IceBreaker Assistance Requested
LubeOil_Commenced	STATIONARY	LUBEOIL_OPERATION	COMMENCED	Lube Oil Operation Commenced
LubeOil_Completed	STATIONARY	LUBEOIL_OPERATION	COMPLETED	Lube Oil Operation Completed
LubeOil_Confirmed	STATIONARY	LUBEOIL_OPERATION	CONFIRMED	Lube Oil Operation Confirmed
LubeOil_Denied	STATIONARY	LUBEOIL_OPERATION	DENIED	Lube Oil Operation Request Denied
LubeOil_ReqReceived	STATIONARY	LUBEOIL_OPERATION	REQUEST_RECEIVED	Lube Oil Operation Request Received
LubeOil_Requested	STATIONARY	LUBEOIL_OPERATION	REQUESTED	Lube Oil Operation Requested
Pilotage_Commenced	NAUTICAL	PILOTAGE	COMMENCED	Pilotage Commenced
Pilotage_Completed	NAUTICAL	PILOTAGE	COMPLETED	Pilotage Completed
Pilotage_confirmed	NAUTICAL	PILOTAGE	CONFIRMED	Pilotage Confirmed
Pilotage_Denied	NAUTICAL	PILOTAGE	DENIED	Pilotage Request Denied
Pilotage_ReqReceived	NAUTICAL	PILOTAGE	REQUEST_RECEIVED	Pilotage Request Recieved
Pilotage_requested	NAUTICAL	PILOTAGE	REQUESTED	Pilotage Requested
PliotBoat_confirmed	NAUTICAL	PILOTBOAT	CONFIRMED	Pilot Boat Confirmed
PliotBoat_Denied	NAUTICAL	PILOTBOAT	DENIED	Pilot Boat Denied
PliotBoat_ReqReceived	NAUTICAL	PILOTBOAT	REQUEST_RECEIVED	Pilot Boat Request Received
PliotBoat_requested	NAUTICAL	PILOTBOAT	REQUESTED	Pilot Boat Requested
PortDeparture_Confirmed	STATIONARY	DEPARTURE_PORTAREA	CONFIRMED	Departure Vessel Port Confired
PortDeparture_Denied	STATIONARY	DEPARTURE_PORTAREA	DENIED	Departure Vessel Port Request Denied
PortDeparture_ReqReceived	STATIONARY	DEPARTURE_PORTAREA	REQUEST_RECEIVED	Departure Vessel Port Request Received
PortDeparture_Requested	STATIONARY	DEPARTURE_PORTAREA	REQUESTED	Departure Vessel Port Requested
PortVisit_Confirmed	STATIONARY	ARRIVAL_PORTAREA	CONFIRMED	Arrival Vessel Port Confirmed
PortVisit_Denied	STATIONARY	ARRIVAL_PORTAREA	DENIED	Arrival Vessel Port Request Denied
PortVisit_ReqReceived	STATIONARY	ARRIVAL_PORTAREA	REQUEST_RECEIVED	Arrival Vessel Port Request Received
PortVisit_Requested	STATIONARY	ARRIVAL_PORTAREA	REQUESTED	Arrival Vessel Port Requested
PostCargoSurvey_Commenced	STATIONARY	POSTCARGOSURVEY	COMMENCED	Post cargo survey commenced
PostCargoSurvey_Completed	STATIONARY	POSTCARGOSURVEY	COMPLETED	Post cargo survey completed
PostCargoSurvey_Confirmed	STATIONARY	POSTCARGOSURVEY	CONFIRMED	Post cargo survey confirmed
PostCargoSurvey_Denied	STATIONARY	POSTCARGOSURVEY	DENIED	Post Cargo Survey Request Denied
PostCargoSurvey_ReqReceived	STATIONARY	POSTCARGOSURVEY	REQUEST_RECEIVED	Post Cargo Survey Request Received
PostCargoSurvey_Requested	STATIONARY	POSTCARGOSURVEY	REQUESTED	Post Cargo Survey Requested
Pontoons_and_Fenders_Confirmed	STATIONARY	PONTOONS_AND_FENDERS	CONFIRMED	Pontoons&Fenders Confirmed
Pontoons_and_Fenders_Denied	STATIONARY	PONTOONS_AND_FENDERS	DENIED	Pontoons&Fenders Denied
Pontoons_and_Fenders_ReqReceived	STATIONARY	PONTOONS_AND_FENDERS	REQUEST_RECEIVED	Pontoons&Fenders Request Received
Pontoons_and_Fenders_Requested	STATIONARY	PONTOONS_AND_FENDERS	REQUESTED	Pontoons&Fenders Requested
PreCargoSurvey_Commenced	STATIONARY	PRECARGOSURVEY	COMMENCED	Pre Cargo Survey Commenced
PreCargoSurvey_Completed	STATIONARY	PRECARGOSURVEY	COMPLETED	Pre Cargo Survey Completed
PreCargoSurvey_Confirmed	STATIONARY	PRECARGOSURVEY	CONFIRMED	Pre Cargo Survey Confirmed
PreCargoSurvey_Denied	STATIONARY	PRECARGOSURVEY	DENIED	Pre Cargo Survey Request Denied
PreCargoSurvey_ReqReceived	STATIONARY	PRECARGOSURVEY	REQUEST_RECEIVED	Pre Cargo Survey Request Received
PreCargoSurvey_Requested	STATIONARY	PRECARGOSURVEY	REQUESTED	Pre Cargo Survey Requested
Provision_Commenced	STATIONARY	PROVISION_OPERATION	COMMENCED	Provision Operation Commenced
Provision_Completed	STATIONARY	PROVISION_OPERATION	COMPLETED	Provision Operation Completed
Provision_Confirmed	STATIONARY	PROVISION_OPERATION	CONFIRMED	Provision Operation Confirmed
Provision_Denied	STATIONARY	PROVISION_OPERATION	DENIED	Provision Operation Request Denied
Provision_ReqReceived	STATIONARY	PROVISION_OPERATION	REQUEST_RECEIVED	Provision Operation Request Received
Provision_Requested	STATIONARY	PROVISION_OPERATION	REQUESTED	Provision Operation Requested
ReadyToSailOp_Commenced	STATIONARY	DEPARTURE_BERTH	COMMENCED	Ready-to-Sail Operations Commenced
ReadyToSailOp_Completed	STATIONARY	DEPARTURE_BERTH	COMPLETED	Ready-to-Sail Operations Completed

Figure 12: Definition of service states - part 2

State Id	Service type	Service object	Time Sequence	Name
Security_Commenced	STATIONARY	SECURITY	COMMENCED	Security Commenced
Security_Completed	STATIONARY	SECURITY	COMPLETED	Security Completed
Security_Confirmed	STATIONARY	SECURITY	CONFIRMED	Security Confirmed
Security_Denied	STATIONARY	SECURITY	DENIED	Security Denied
Security_ReqReceived	STATIONARY	SECURITY	REQUEST_RECEIVED	Security Request Received
Security_Requested	STATIONARY	SECURITY	REQUESTED	Security Requested
SkilledWorker_Confirmed	STATIONARY	SKILLED_WORKER	CONFIRMED	Skilled Worker Confirmed
SkilledWorker_Denied	STATIONARY	SKILLED_WORKER	DENIED	Skilled Worker Denied
SkilledWorker_ReqReceived	STATIONARY	SKILLED_WORKER	REQUEST_RECEIVED	Skilled Worker Request Received
SkilledWorker_Requested	STATIONARY	SKILLED_WORKER	REQUESTED	Skilled Worker Received
SlopOp_Commenced	STATIONARY	SLOP_OPERATION	COMMENCED	Slop Operation Commenced
SlopOp_Completed	STATIONARY	SLOP_OPERATION	COMPLETED	Slop Operation Completed
SlopOp_Confirmed	STATIONARY	SLOP_OPERATION	CONFIRMED	Slop Operation Confirmed
SlopOp_Denied	STATIONARY	SLOP_OPERATION	DENIED	Slop Operation Request Denied
SlopOp_ReqReceived	STATIONARY	SLOP_OPERATION	REQUEST_RECEIVED	Slop Operation Request Received
SlopOp_Requested	STATIONARY	SLOP_OPERATION	REQUESTED	Slop Operation Requested
SludgeOp_Commenced	STATIONARY	SLUDGE_OPERATION	COMMENCED	Sludge Operation Commenced
SludgeOp_Completed	STATIONARY	SLUDGE_OPERATION	COMPLETED	Sludge Operation Completed
SludgeOp_Confirmed	STATIONARY	SLUDGE_OPERATION	CONFIRMED	Sludge Operation Confirmed
SludgeOp_Denied	STATIONARY	SLUDGE_OPERATION	DENIED	Sludge Operation Request Denied
SludgeOp_ReqReceived	STATIONARY	SLUDGE_OPERATION	REQUEST_RECEIVED	Sludge Operation Request Received
SludgeOp_Requested	STATIONARY	SLUDGE_OPERATION	REQUESTED	Sludge Operation Requested
Tours_Commenced	STATIONARY	TOURS	COMMENCED	Tours Commenced
Tours_Completed	STATIONARY	TOURS	COMPLETED	Tours Completed
Tours_Confirmed	STATIONARY	TOURS	CONFIRMED	Tours Confirmed
Tours_Denied	STATIONARY	TOURS	DENIED	Tours Denied
Tours_ReqReceived	STATIONARY	TOURS	REQUEST_RECEIVED	Tours Request Received
Tours_Requested	STATIONARY	TOURS	REQUESTED	Tours Requested
Towage_Commenced	NAUTICAL	TOWAGE	COMMENCED	Towage Commenced
Towage_Completed	NAUTICAL	TOWAGE	COMPLETED	Towage Completed
Towage_Confirmed	NAUTICAL	TOWAGE	CONFIRMED	Towage Confirmed
Towage_Denied	NAUTICAL	TOWAGE	DENIED	Towage Request Denied
Towage_ReqReceived	NAUTICAL	TOWAGE	REQUEST_RECEIVED	Towage Request Received
Towage_Requested	NAUTICAL	TOWAGE	REQUESTED	Towage Requested
VTSAreaDepart_Confirmed	STATIONARY	VTSAREA_DEPART	CONFIRMED	VTS TrafficArea Departure Confirmed
VTSAreaDepart_Denied	STATIONARY	VTSAREA_DEPART	DENIED	VTS TrafficArea Departure Denied
VTSAreaDepart_ReqReceived	STATIONARY	VTSAREA_DEPART	REQUEST_RECEIVED	VTS TrafficArea Departure Request Received
VTSAreaDepart_Requested	STATIONARY	VTSAREA_DEPART	REQUESTED	VTS TrafficArea Departure Requested
VTSAreaEntry_Confirmed	STATIONARY	VTSAREA_ENTRY	CONFIRMED	VTS TrafficArea Entry Confirmed
VTSAreaEntry_Denied	STATIONARY	VTSAREA_ENTRY	DENIED	VTS TrafficArea Entry Denied
VTSAreaEntry_ReqReceived	STATIONARY	VTSAREA_ENTRY	REQUEST_RECEIVED	VTS TrafficArea Entry Request Received
VTSAreaEntry_Requested	STATIONARY	VTSAREA_ENTRY	REQUESTED	VTS TrafficArea Entry Requected
WaterOp_Commenced	STATIONARY	WATER_OPERATION	COMMENCED	Water Operation Commenced
WaterOp_Completed	STATIONARY	WATER_OPERATION	COMPLETED	Water Operation Completed
WaterOp_Confirmed	STATIONARY	WATER_OPERATION	CONFIRMED	Water Operation Confirmed
WaterOp_Denied	STATIONARY	WATER_OPERATION	DENIED	Water Operation Request Denied
WaterOp_ReqReceived	STATIONARY	WATER_OPERATION	REQUEST_RECEIVED	Water Operation Request Received
WaterOp_Requested	STATIONARY	WATER_OPERATION	REQUESTED	Water Operation Requested

Figure 12: Definition of service states - part 3

APPENDIX II: SCHEMA DEFINITION

```
<?xml version="1.0" encoding="utf-8" ?>
<!-- changelog
Version: 0.0.15
Revision date: 2016-09-01
 - new message type: MessageOperation. For handling operations on previously submitted Port Call Messages
 - enumeration updates
   + LocationReferenceObject
      - AGENT
      - MOORER
   + ServiceObject
      - ARRIVAL_MOORING_OPERATION
      - DEPARTURE_MOORING_OPERATION
   + ServiceTimeSequence
      - CANCELLED removed (into TimeType)
   + TimeType
      - CANCELLED added
   +LogicalLocation
      - NEXT_PORT and PREVIOUS_PORT removed
 - length of comment now set to 200 characters
 - time moved into LocationState and ServiceState
 - timeType moved into LocationState and ServiceState

Version: 0.0.14
Revision date: 2016-07-07
 - enumeration updates
   + ServiceObject
      - GANGWAY
      - EMBARKING
      - PILOT_BOAT
      - PONTOONS_AND_FENDERS
      - SECURITY
      - TOURS
      - FORKLIFT
   + LocationReferenceObject
      - SKILLED_WORKER
   + ServiceTimeSequence
      - CANCELLED
 - update MRN type to allow for upper case letters

Version: 0.0.13
Revision date: 2016-05-23
 - made performingActor in ServiceState optional
 - changed performingActor in ServiceState to a simple MRN, to allow for any type of MRN based identifier
 - changed schema namespace to URN
 - added schema location to appInfo
 - fixed inconsistent formatting of changelog

Version: 0.0.12
Revision date: 2016-05-06
 - changed regex for PortCallIdentifier to allow upper case characters in URN

Version: 0.0.11
Revision date: 2016-04-26
 - enumeration updates
   + ServiceTimeSequence
      - REQUEST -> REQUESTED
      - CONFIRM -> CONFIRMED
      - new REQUEST_RECEIVED
      - new DENIED

   +ServiceObject
      - ARRIVAL_ANCHORAGEAREA -> ARRIVAL_ANCHORING_OPERATION
      - DEPARTURE_ANCHORAGEAREA -> DEPARTURE_ANCHORING_OPERATION
      - new ANCHORING
      - new ARRIVAL_VTSAREA
      - new BERTH_SHIFTING
      - new DEPARTURE_VTSAREA

   + LocationReferenceObject
      - ICE_BREAKER -> ICEBREAKER
```

+LogicalLocation
- ANCHORAGE_AREA -> ANCHORING_AREA
- PILOT_STATION -> PILOT_BOARDING_AREA
- TUG_STATION -> TUG_ZONE
- new ETUG_ZONE
- new LOC
- new NEXT_PORT
- new PREVIOUS_PORT
- new RENDEZV_AREA
- new VESSEL

Version: 0.0.9
Revision date: 2016-04-19
- renamed ServiceReferenceObject to follow concept standard
- updated ServiceObject with new list of constants

Version: 0.0.8
Revision date: 2016-04-15
- field length for PortCallMessageIdentifier changed from 67 to 66, to match the actual pattern

Version: 0.0.7
Revision date: 2016-04-06
- Made reportedBy and reportedAt optional, since they should be determined be the receiving service

Version: 0.0.6
Revision date: 2016-04-01
- Added PORT to LogicalLocation

Version: 0.0.5
Revision date: 2016-03-31
- Moved REQUEST and CONFIRM from TimeType to ServiceTimeSequence

Version: 0.0.4
Revision date: 2016-03-16
- Renamed LatLong type Position
- Added coordinate system to documentation for Position
- Added type MRN
- Added MRN based identifiers for port call and message

Version: 0.0.3
Revision date:2016-02-19
- Made groupWith optional

Version: 0.0.2
Revision date:2016-02-19
- Added missing element portCallId to root node
- Added performingActor to type ServiceState
- Added messageId
- Added groupWith
-->

```
<xs:schema attributeFormDefault="unqualified"
        elementFormDefault="qualified"
        xmlns:xs="http://www.w3.org/2001/XMLSchema"
        xmlns:pcm="urn:x-mrn:stm:schema:port-call-message:0.0.15"
        targetNamespace="urn:x-mrn:stm:schema:port-call-message:0.0.15">
   <xs:annotation>
      <xs:appinfo>
         version = 0.0.15
         revisionDate = 2016-09-01
         schemaLocation = http://specification.portcdm.eu/pcm/v0.0.15/port-call-message.xsd
      </xs:appinfo>
      <xs:documentation>
         Schema for PortCDM PortCall Message Format
         The root element is a Port Call Message, containing some metadata about when and by whom this message was
         sent, followed by a time type and either a location state or a service state.
         <dl>
            <dt>messageId</dt>
            <dd>URN formatted and UUID-based so that no central identity management is necessary</dd>
            <dt>groupWith</dt>
            <dd>messageId of another message that this message should be grouped with. This is to facilitate
            repeated events like berth shifting by improving the ability to group data</dd>
            <dt>portCallId/localJobId</dt>
            <dd>portCallId is the global port call id allocated by PortCDM. localJobId is the job or port call id used in the connecting system. For
connectors, one or zero
```

```
            of these can be used. Port Call Messages going into Message Brokering must have portCallId set appropriately</dd>
        </dl>
        There is also an optional comment element. All time values are in ISO-8601 format as per the dateTime type, in UTC, as denoted by the Z
suffix
      </xs:documentation>
    </xs:annotation>

    <xs:element name="portCallMessage">
      <xs:complexType>
        <xs:sequence>
          <xs:choice minOccurs="0">
            <xs:element name="portCallId" type="pcm:PortCallIdentifier"/>
            <xs:element name="localJobId" type="pcm:LocalJobIdentifier"/>
          </xs:choice>
          <xs:element name="vesselId" type="pcm:VesselIdentifier" minOccurs="0"/>
          <xs:element name="messageId" type="pcm:PortCallMessageIdentifier"/>
          <xs:element name="groupWith" type="pcm:PortCallMessageIdentifier" minOccurs="0"/>
          <xs:element name="reportedAt" type="xs:dateTime" minOccurs="0"/>
          <xs:element name="reportedBy" type="xs:string" minOccurs="0"/>
          <xs:element name="comment" minOccurs="0">
            <xs:annotation>
              <xs:documentation>
                Comment is limited to a maximum of 200 characters.
                Please note that since the encoding is UTF-8, this means a maximum of 800 bytes in this
                field
              </xs:documentation>
            </xs:annotation>
            <xs:simpleType>
              <xs:restriction base="xs:string">
                <xs:maxLength value="200"/>
              </xs:restriction>
            </xs:simpleType>
          </xs:element>
          <xs:choice>
            <xs:element name="messageOperation" type="pcm:MessageOperation"/>
            <xs:element name="locationState" type="pcm:LocationState" />
            <xs:element name="serviceState" type="pcm:ServiceState" />
          </xs:choice>
        </xs:sequence>
      </xs:complexType>
    </xs:element>

    <xs:complexType name="LocationState">
      <xs:annotation>
        <xs:documentation>
          LocationState is a representation for LOCATION STATE in the specification.
          It describes a time related data point for an arrival to or departure from a specified location.
          Time sequence is expressed implicitly by the choice of element arrivalLocation or departureLocation.
          This is to avoid the redundancy of having to add a fixed element in each of the respective elements
          (ARRIVAL for arrivalLocation and DEPARTURE for departureLocation. Using this design allows us to dictate
          in the messaging format itself that "to" is mandatory, and "from" optional if time sequence is ARRIVAL
          and the reversed for time sequence DEPARTURE
        </xs:documentation>
      </xs:annotation>
      <xs:sequence>
        <xs:element name="referenceObject" type="pcm:LocationReferenceObject"/>
        <xs:element name="time" type="xs:dateTime"/>
        <xs:element name="timeType" type="pcm:TimeType"/>
        <xs:choice>
          <xs:element name="arrivalLocation">
            <xs:complexType>
              <xs:sequence>
                <xs:element type="pcm:Location" name="from" minOccurs="0"/>
                <xs:element type="pcm:Location" name="to"/>
              </xs:sequence>
            </xs:complexType>
          </xs:element>
          <xs:element name="departureLocation">
            <xs:complexType>
              <xs:sequence>
                <xs:element type="pcm:Location" name="from"/>
                <xs:element type="pcm:Location" name="to" minOccurs="0"/>
              </xs:sequence>
            </xs:complexType>
```

```
        </xs:element>
      </xs:choice>
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="ServiceState">
    <xs:annotation>
      <xs:documentation>
        ServiceState is a representation for SERVICE STATE in the specification.
        It describes a time related data point for a service. The service can be either stationary
        (sludge, bunkering, cargo operations ) in which case the "at" elements hold its location or navigational
        (towage, escort towage or piloting) which requires to and from locations.

        performingActor is a MRN, which allows for any type of identifier that can be expressed in that format.
        This can be an indirect reference to an actor, like the IMO or MMSI based identifier for a tug boat, which
        in itself is not an actor, but a resource associated with an actor.
      </xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="serviceObject" type="pcm:ServiceObject"/>
      <xs:element name="performingActor" type="pcm:MRN" minOccurs="0"/>
      <xs:element name="timeSequence" type="pcm:ServiceTimeSequence"/>
      <xs:element name="time" type="xs:dateTime"/>
      <xs:element name="timeType" type="pcm:TimeType"/>
      <xs:choice>
        <xs:element name="at" type="pcm:Location"/>
        <xs:element name="between">
          <xs:complexType>
            <xs:sequence>
              <xs:element name="to" type="pcm:Location"/>
              <xs:element name="from" type="pcm:Location"/>
            </xs:sequence>
          </xs:complexType>
        </xs:element>
      </xs:choice>
    </xs:sequence>
  </xs:complexType>

  <xs:simpleType name="ServiceObject">
    <xs:restriction base="xs:string">
      <xs:enumeration value="ANCHORING"/>
      <xs:enumeration value="ARRIVAL_ANCHORING_OPERATION"/>
      <xs:enumeration value="ARRIVAL_BERTH"/>
      <xs:enumeration value="ARRIVAL_PORTAREA"/>
      <xs:enumeration value="ARRIVAL_VTSAREA"/>
      <xs:enumeration value="BERTH_SHIFTING"/>
      <xs:enumeration value="BUNKERING_OPERATION"/>
      <xs:enumeration value="CARGO_OPERATION"/>
      <xs:enumeration value="DEPARTURE_ANCHORING_OPERATION"/>
      <xs:enumeration value="DEPARTURE_BERTH"/>
      <xs:enumeration value="DEPARTURE_PORTAREA"/>
      <xs:enumeration value="DEPARTURE_VTSAREA"/>
      <xs:enumeration value="ESCORT_TOWAGE"/>
      <xs:enumeration value="GARBAGE_OPERATION"/>
      <xs:enumeration value="ICEBREAKING_OPERATION"/>
      <xs:enumeration value="LUBEOIL_OPERATION"/>
      <xs:enumeration value="ARRIVAL_MOORING_OPERATION"/>
      <xs:enumeration value="DEPARTURE_MOORING_OPERATION"/>
      <xs:enumeration value="PILOTAGE"/>
      <xs:enumeration value="POSTCARGOSURVEY"/>
      <xs:enumeration value="PRECARGOSURVEY"/>
      <xs:enumeration value="PROVISION_OPERATION"/>
      <xs:enumeration value="SLOP_OPERATION"/>
      <xs:enumeration value="SLUDGE_OPERATION"/>
      <xs:enumeration value="TOWAGE"/>
      <xs:enumeration value="WATER_OPERATION"/>
      <xs:enumeration value="GANGWAY"/>
      <xs:enumeration value="EMBARKING"/>
      <xs:enumeration value="PILOT_BOAT"/>
      <xs:enumeration value="PONTOONS_AND_FENDERS"/>
      <xs:enumeration value="SECURITY"/>
      <xs:enumeration value="TOURS"/>
      <xs:enumeration value="FORKLIFT"/>
    </xs:restriction>
```

```
  </xs:simpleType>

  <xs:simpleType name="TimeType">
    <xs:restriction base="xs:string">
      <xs:enumeration value="ESTIMATED"/>
      <xs:enumeration value="ACTUAL"/>
      <xs:enumeration value="TARGET"/>
      <xs:enumeration value="RECOMMENDED"/>
      <xs:enumeration value="CANCELLED"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="Location">
    <xs:sequence>
      <xs:element name="locationType" type="pcm:LogicalLocation"/>
      <!-- Geographical position, for dynamically defined locations like TUG_STATION -->
      <xs:element name="position" type="pcm:Position" minOccurs="0"/>
      <!-- Location name such as specific quay number or anchoring area name -->
      <xs:element name="name" type="xs:string" minOccurs="0"/>
    </xs:sequence>
  </xs:complexType>

  <xs:simpleType name="ServiceTimeSequence">
    <xs:restriction base="xs:string">
      <xs:enumeration value="COMMENCED"/>
      <xs:enumeration value="COMPLETED"/>
      <xs:enumeration value="CONFIRMED"/>
      <xs:enumeration value="DENIED"/>
      <xs:enumeration value="REQUESTED"/>
      <xs:enumeration value="REQUEST_RECEIVED"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="LocationReferenceObject">
    <xs:restriction base="xs:string">
      <xs:enumeration value="VESSEL"/>
      <xs:enumeration value="TUG"/>
      <xs:enumeration value="ESCORT_TUG"/>
      <xs:enumeration value="PILOT"/>
      <xs:enumeration value="PILOT_BOAT"/>
      <xs:enumeration value="ICEBREAKER"/>
      <xs:enumeration value="AGENT"/>
      <xs:enumeration value="ARRIVAL_MOORER"/>
      <xs:enumeration value="DEPARTURE_MOORER"/>
      <xs:enumeration value="PASSENGER"/>
      <xs:enumeration value="SECURITY"/>
      <xs:enumeration value="PONTOONS_AND_FENDERS"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:simpleType name="LogicalLocation">
    <xs:restriction base="xs:string">
      <xs:enumeration value="ANCHORING_AREA"/>
      <xs:enumeration value="BERTH"/>
      <xs:enumeration value="ETUG_ZONE"/>
      <xs:enumeration value="LOC"/>
      <xs:enumeration value="PILOT_BOARDING_AREA"/>
      <xs:enumeration value="RENDEZV_AREA"/>
      <xs:enumeration value="TRAFFIC_AREA"/>
      <xs:enumeration value="TUG_ZONE"/>
      <xs:enumeration value="VESSEL"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="Position">
    <xs:annotation>
      <xs:documentation>
        To allow us to include physical, geographical position for locations that aren't predefined at a fixed
        geographical position i.e. the rendezvous point for vessel and tug boat. Coordinate system is WGS84 Decimal Degrees. Format is decimal
degrees notation as described in ISO 6709.
      </xs:documentation>
    </xs:annotation>
    <xs:all>
      <xs:element name="latitude">
```

```
          <xs:annotation>
            <xs:documentation>
              Latitude in decimal degrees notation as described in ISO 6709. Northern latitudes are denoted by
              positive numbers, southern latitudes by negative.
            </xs:documentation>
          </xs:annotation>
          <xs:simpleType>
            <xs:restriction base="xs:double">
              <xs:minInclusive value="-90"/>
              <xs:maxInclusive value="90"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
        <xs:element name="longitude">
          <xs:annotation>
            <xs:documentation>
              Longitude in decimal degrees notation as described in ISO 6709. Eastern longitudes are denoted
              by positive numbers, western longitudes by negative
            </xs:documentation>
          </xs:annotation>
          <xs:simpleType>
            <xs:restriction base="xs:double">
              <xs:minInclusive value="-180"/>
              <xs:maxInclusive value="180"/>
            </xs:restriction>
          </xs:simpleType>
        </xs:element>
      </xs:all>
    </xs:complexType>

    <xs:complexType name="Actor">
      <xs:sequence>
        <xs:element name="id" type="xs:string"/>
        <xs:element name="name" type="xs:string"/>
      </xs:sequence>
    </xs:complexType>

    <xs:simpleType name="UUID">
      <xs:restriction base="xs:string">
        <xs:length value="36" fixed="true" />
        <xs:pattern value="[0-9a-fA-F]{8}-[0-9a-fA-F]{4}-4[0-9a-fA-F]{3}-[8-9a-bA-B][0-9a-fA-F]{3}-[0-9a-fA-F]{12}"/>
      </xs:restriction>
    </xs:simpleType>

    <xs:simpleType name="MRN">
      <xs:annotation>
        <xs:documentation>Marine Resource Name identifier, based on URN. Note that the NID, including the mrn: prefix can be no more than 31
characters long</xs:documentation>
      </xs:annotation>
      <xs:restriction base="xs:string">
        <xs:pattern value="urn:mrn:[A-Za-z0-9][A-Za-z0-9-]{0,27}:[A-Za-z0-9()+,\-.:=@;$_!*'%/?#]+"/>
      </xs:restriction>
    </xs:simpleType>

    <xs:simpleType name="PortCallIdentifier">
      <xs:annotation>
        <xs:documentation>Port call identifier, based on MRN. First element of the NSS should be the UN/Locode of the port</xs:documentation>
      </xs:annotation>
      <xs:restriction base="xs:string">
        <xs:maxLength value="120"/>
        <xs:pattern value="urn:x-mrn:stm:portcdm:port_call:[A-Za-z]{5}:[A-Za-z0-9()+,\-.:=@;$_!*'%/?#]+"/>
      </xs:restriction>
    </xs:simpleType>
    <xs:simpleType name="LocalJobIdentifier">
      <xs:annotation>
        <xs:documentation>Port call identifier, based on MRN. First element of the NSS should be the UN/Locode of
          the port
        </xs:documentation>
      </xs:annotation>
      <xs:restriction base="xs:string">
        <xs:maxLength value="120"/>
        <xs:pattern value="urn:x-mrn:stm:portcdm:local_job:[A-Za-z0-9_]+:[A-Za-z0-9_]+"/>
      </xs:restriction>
    </xs:simpleType>
```

```
  <xs:simpleType name="PortCallMessageIdentifier">
    <xs:annotation>
      <xs:documentation>Port call message identifier, based on MRN and UUID. </xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:string">
      <xs:length value="66" fixed="true" />
      <xs:pattern value="urn:x-mrn:stm:portcdm:message:[0-9a-fA-F]{8}-[0-9a-fA-F]{4}-4[0-9a-fA-F]{3}-[8-9a-bA-B][0-9a-fA-F]{3}-[0-9a-fA-F]{12}"/>
    </xs:restriction>
  </xs:simpleType>

  <xs:complexType name="MessageOperation">
    <xs:annotation>
      <xs:documentation>Administrative operations on messages sent before</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="operation">
        <xs:simpleType>
          <xs:restriction base="xs:string">
            <xs:enumeration value="WITHDRAW"/>
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
      <xs:element name="messageId" type="pcm:PortCallMessageIdentifier"/>
    </xs:sequence>
  </xs:complexType>
  <xs:simpleType name="VesselIdentifier">
    <xs:annotation>
      <xs:documentation>Vessel identifier, based on MRN. Can be either IMO or MMSI based</xs:documentation>
    </xs:annotation>
    <xs:restriction base="xs:string">
      <xs:pattern value="urn:x-mrn:stm:vessel:(IMO|MMSI):[0-9]{7}"/>
    </xs:restriction>
  </xs:simpleType>
</xs:schema>
```