

Paper for consideration by NIPWG2

Data model harmonisation and improvement

<b>Submitted by:</b>	NIPWG Chair
<b>Executive Summary:</b>	Summary of harmonisation items and data model improvement
<b>Related Documents:</b>	
<b>Related Projects:</b>	S-124 (Radio Services)

**Introduction / Background**

S-100 based ECDIS will provide information which comes from various products. These products may depend on different Product Specifications. It has been considered that a harmonised data model used in these Product Specifications is beneficial for both the software developer and the end user. It provides a harmonised information approach, reduces misinterpretations caused by different terms used for the same purpose and allows multiple use of software components.

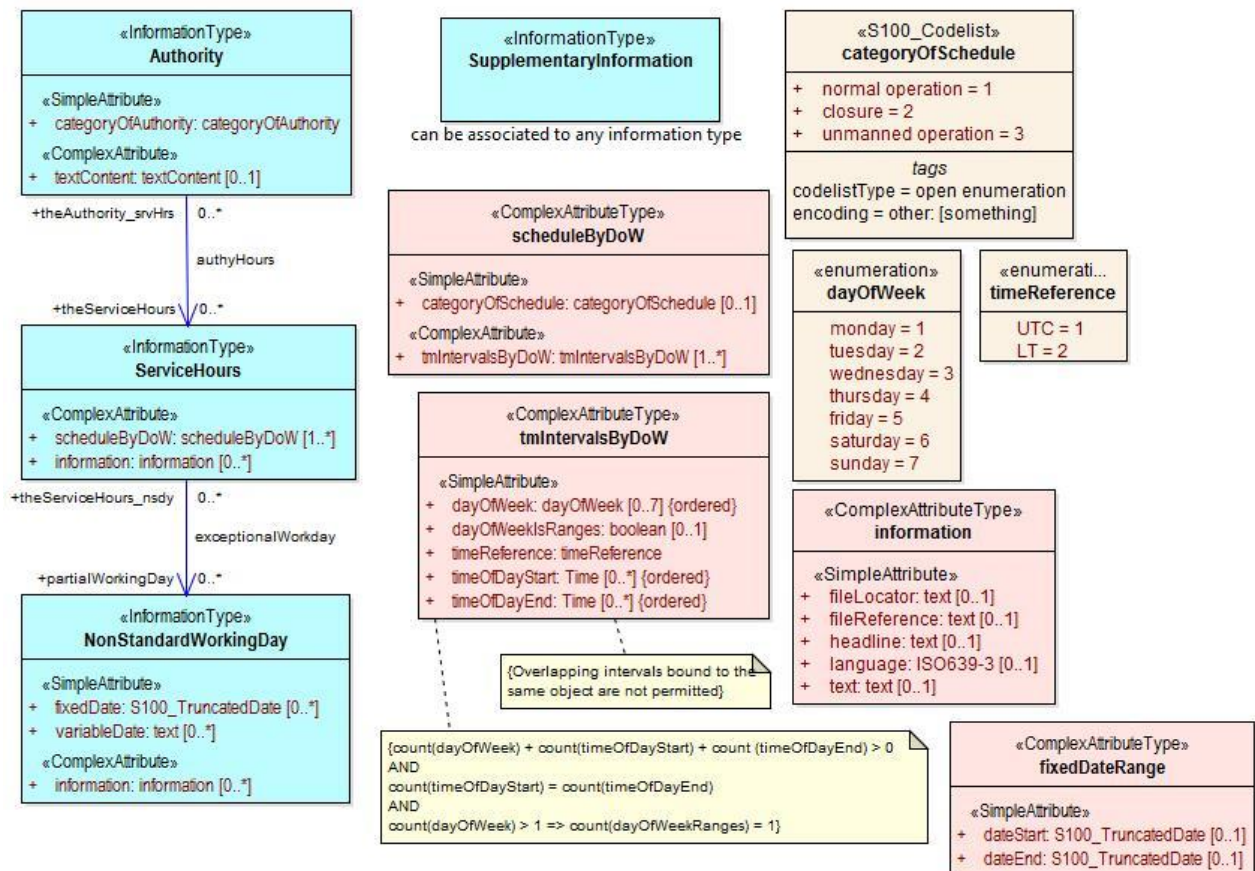
The data model harmonisation of the S-101 (ENC) and S-122 (MAP) and S-123 (Radio Services) is currently in focus. It is anticipated that solutions found for the S-101/S-122 harmonisation could easily apply for S-123.

**Discussion**

NIPWG provided the following topics to the S-101 development team for consideration:

- Working schedules
- Text content

**Working Schedule**



The new model is a simplification of the model developed earlier by SNPWG. It also adds an extensible codelist attribute that allows schedules to be categorised by type. The updates are also needed by models being developed by other groups.

Note: FOR REASONS OF ECONOMY, DELEGATES ARE KINDLY REQUESTED TO BRING THEIR OWN COPIES OF THE DOCUMENTS TO THE MEETING

# Schedule by Day of Week (complex attribute)

## Camel case: scheduleByDoW

Describes the nature and timings of a daily schedule by days of the week.

### Attributes

Role Name	Name	Multiplicity	Data type	Description / Remarks
Attribute	categoryOfSchedule	[0..1]	categoryOfSchedule	Describes the type of schedule, e.g., opening, closure, etc.
Complex Attribute	tmIntervalsByDoW	[1..*]	tmIntervalsByDoW	

# Time Intervals by Day of Week (complex attribute)

## Camel case: tmIntervalsByDoW

Remarks:

- The sub-attribute *dayOfWeeksRanges* indicates whether an instance of this attribute encodes a range of days or discrete days. The days or day-range(s) are encoded in sub-attribute *dayOfWeek*. Multiple ranges are allowed but mixing range with discrete days(s) is not allowed (encode another instance of this attribute instead).
- An indeterminate range may be indicated with a null value at the appropriate position in the sequence.

Constraints:

- Overlapping intervals bound to the same object are not permitted.
- At least one of the attributes *dayOfWeek*, *timeOfDayStart*, *timeOfDayEnd* must be encoded.
- The number of instances of *timeOfDayStart* must be the same as the number of instances of *timeOfDayEnd*.
- If more than one instance of *dayOfWeek* is encoded, attribute *dayOfWeekRanges* is required.

Examples:

- To code the range “Monday through Friday” use the sequence: *dayOfWeek=1*, *dayOfWeek=5* and set *dayOfWeeksRanges=TRUE*.
- To encode the days Monday, Wednesday, Friday, use the sequence *dayOfWeek=1*, *dayOfWeek=3*, *dayOfWeek=5* and set *dayOfWeeksRanges=FALSE*.
- The sequence *dayOfWeek=1*, *dayOfWeek=3*, *dayOfWeek=5* to indicate Mon-Wed and Thursday is not allowed. Encode the Mon-Wed and Thursday schedules in different instances of this complex attribute.

Product specifications may need to allow this attribute to be repeated in order to allow encoding of schedules which vary for different days of the week.

### Attributes

Role Name	Name	Multiplicity	Data type	Description / Remarks
Attribute	dayOfWeek	[0..7]	dayOfWeek	Encodes either range(s) of days or discrete days.
Attribute	dayOfWeeksRanges	[0..1]	boolean	Indicates whether the values in <i>dayOfWeek</i> indicate a range of days (true) or discrete days (false). Mandatory if co-attribute <i>dayOfWeek</i> has cardinality > 1.
Attribute	timeReference	[1]	timeReference	Indicates whether the time co-attributes are encoded in UTC or local time (LT).

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Role Name	Name	Multiplicity	Data type	Description / Remarks
Attribute	timeOfDayStart	[0..*]	Time	Starting time of day, possibly for a period within the day. Distinction: Time start (TIMSTA) (S-101) which has a format YYYYMMDDThhmmss <b>(mandatory)</b> in the baseline S-101 DCEG as of October 2015.
Attribute	timeOfDayEnd	[0..*]	Time	Ending time of day, possibly for a period within the day. Distinction: Time end (TIMEND) (S-101) which has a format YYYYMMDDThhmmss <b>(mandatory)</b> in the baseline S-101 DCEG as of October 2015.

## Category of Schedule (S100 Codelist)

### Camel case: categoryOfSchedule

Describes the type of schedule, e.g., opening, closure, etc.

Tag: codelistType open enumeration

Tag: encoding other: [something]

### Listed Values

Role Name	Name	Description / Remarks
Literal	normal operation	The service, office, is open, fully manned, and operating normally, or the area is accessible as usual.
Literal	closure	The service, office, or area is closed.
Literal	unmanned operation	The service is available but not manned.

## Time Reference (Enumeration)

### Camel case: timeReference

### Listed Values

Role Name	Name	Description / Remarks
Literal	UTC	Coordinated Universal Time
Literal	LT	Local time

## Service Hours (Information Type)

### Camel case: ServiceHours

The time when a service is available and known exceptions.

### Attributes

Role Name	Name	Multiplicity	Data type	Description / Remarks
Complex Attribute	scheduleByDoW	[1..*]	scheduleByDoW	

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Role Name	Name	Multiplicity	Data type	Description / Remarks
Complex Attribute	information	[0..*]	information	

## Inherited Attributes

Role Name	Name	Multiplicity	Data type	Description / Remarks
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	

## Associations

Association name	Source	Target	Notes
exceptionalWorkday Association	Label: ServiceHours Role: theServiceHours_nsd Multiplicity: 0..*	Label: NonStandardWorkingDay Role: partialWorkingDay Multiplicity: 0..*	
authyHours Association	Label: Authority Role: theAuthority_srvHrs Multiplicity: 0..*	Label: ServiceHours Role: theServiceHours Multiplicity: 0..*	

## Non-Standard Working Day (Information Type)

### Camel case: NonStandardWorkingDay

Days when many services are not available. Often days of festivity or recreation when normal working hours are limited, esp. a national or religious festival, etc.

## Attributes

Role Name	Name	Multiplicity	Data type	Description / Remarks
Attribute	fixedDate	[0..*]	S100_TruncatedDate	The date when a festival or national holiday recurs on the same day each year in the Gregorian calendar.
Attribute	variableDate	[0..*]	text	A day which is not fixed in the Gregorian calendar. Examples: The fourth Thursday in November; new moon day of Kartika (Diwali); Easter Sunday.
Complex Attribute	information	[0..*]	information	

## Inherited Attributes

Role Name	Name	Multiplicity	Data type	Description / Remarks
Complex Attribute	featureName	[0..*]	featureName	
Complex Attribute	fixedDateRange	[0..1]	fixedDateRange	
Complex Attribute	periodicDateRange	[0..*]	periodicDateRange	
Complex Attribute	sourceIndication	[0..1]	sourceIndication	

## Associations

Association name	Source	Target	Notes
exceptionalWorkday Association	Label: ServiceHours Role: theServiceHours_nsd	Label: NonStandardWorkingDay Role: partialWorkingDay	

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<i>Association name</i>	<i>Source</i>	<i>Target</i>	<i>Notes</i>
	<i>Multiplicity:</i> 0..* <i>Ordered:</i> 0	<i>Multiplicity:</i> 0..* <i>Ordered:</i> 0	

## Fixed data range (Complex attribute)

### Camel case: fixedDateRange

Describes a single fixed period, as the date range between its sub-attributes.

Remarks: Sub-attributes date end and date start must have the calendar year encoded using 4 digits for the calendar year (CCYY). Month (MM) and day (DD) are optional.

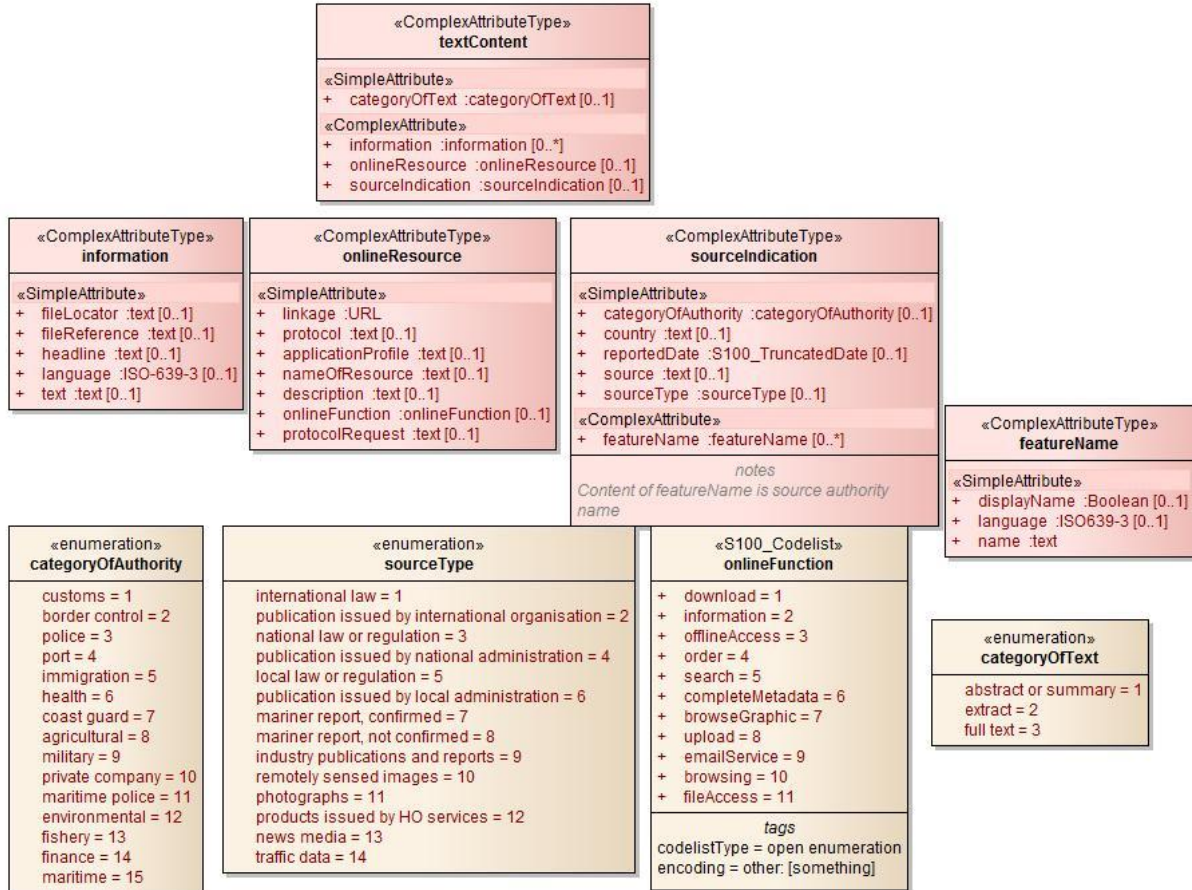
(This definition merges the planned S-100 temporal model with the current S-101 DCEG definition of fixed date range.)

### Attributes

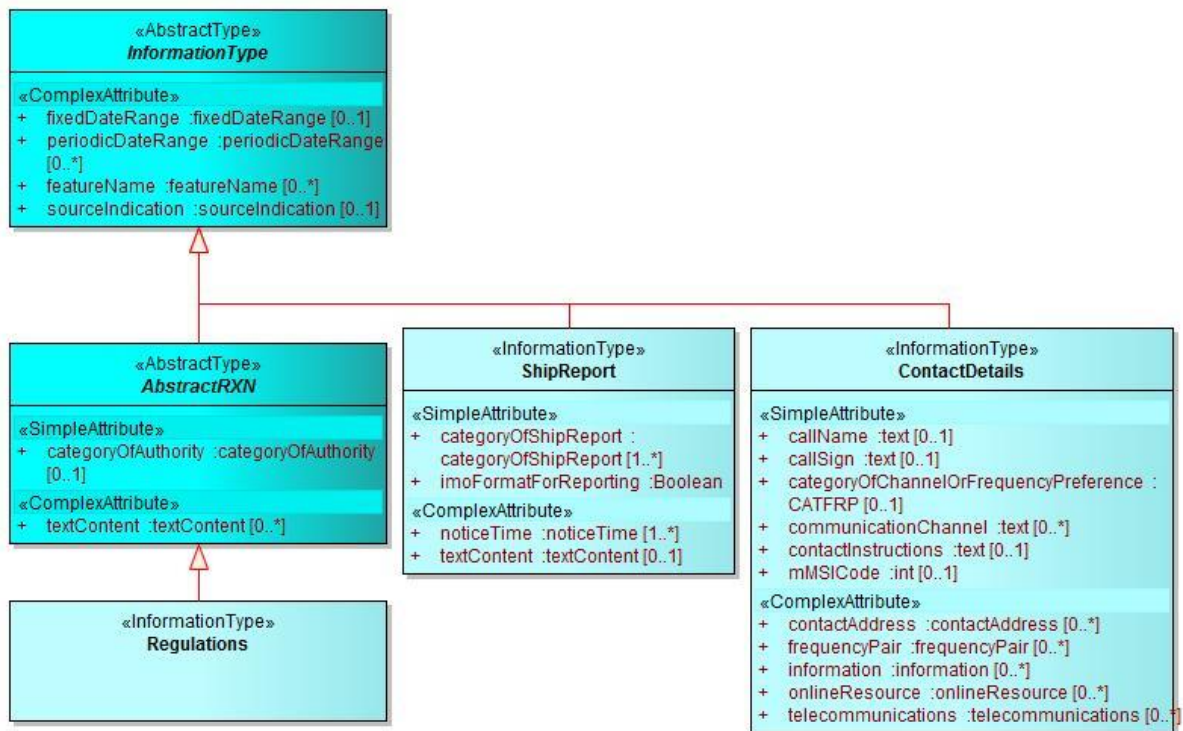
<i>Role Name</i>	<i>Name</i>	<i>Multiplicity</i>	<i>Data type</i>	<i>Description / Remarks</i>
Attribute	dateStart	[0..1]	S100_TruncatedDate	The start date or time of the interval.
Attribute	dateEnd	[0..1]	S100_TruncatedDate	The end date or time of the interval.

# Text Content and source information

## New model for text content



The figure below provides examples from the S-122 (Marine Protected Areas) and S-123 (Radio Services) application schema.



### Example 1

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Information type Regulations is intended for encoding regulations such as extracts from shipping regulations. It inherits the complex attribute **textContent** from its parent. This allows regulations to be encoded either:

- As embedded text in Regulations -> textContent -> information -> text.
- In an HTML support file. The file is named in Regulations -> textContent -> information -> fileReference.
- As the URL of the most recent online version of national shipping regulations, using Regulations -> textContent -> onlineResource -> linkage for the web address.

### Example 2

Information type ShipReport describes the type, reporting times, and format of a ship report. The precise format and required components are described in a support file named by ShipReport -> textContent -> information -> fileReference.

### Example 3

If certain conditions are satisfied it is possible to abbreviate the model even more. This is the case if the text information is a short string that effectively acts as a substitute for an enumerated attribute or "listed value" that is not part of the model. In these situations the other sub-attributes of "**textContent**" (e.g. **categoryOfText**, **onlineResource**, and **sourceIndication**) will not be used. The full "**textContent**" model is superfluous in these cases and adds unnecessary overhead and the complex attribute **information** can be bound instead.

For example in **Error! Reference source not found.**, the feature **Contact Details** does not bind "**text content**". Instead it binds the attribute "**information**" which can be regarded as acting as a proxy for a hypothetical "category of contact" or "description of contact" attribute (neither of which is defined). For **Contact Details**, the additional text information is encoded as:

```
<ContactDetails>
  <information>
    <text>Supplementary information for Jussland MRCC RT (MF) radio</text>
  </information>
  <frequencyPair>
    <frequencyShoreStationTransmits>2182000</frequencyShoreStationTransmits>
    <frequencyShoreStationReceives>2182000</frequencyShoreStationReceives>
    <frequencyShoreStationTransmits>8291000</frequencyShoreStationTransmits>
    <frequencyShoreStationReceives>8291000</frequencyShoreStationReceives>
  </frequencyPair>
</ContactDetails>
```

### **Complex attribute Source Indication**

Attribute: **Source Indication**, Alpha code: SORIND, Camel case: sourceIndication

Attribute type: Complex

SubAttributes:

Name	AlphaCode	CamelCase	Multiplicity	Sequential
Source Type	SORTYP	sourceType	0..1	n/a
Source	SOURCE	source	0..1	n/a
Reported date	REPDAT	reportedDate	0..1	n/a
Country	CONTRY	country	0..1	n/a
Category of Authority	CATAUT	categoryOfAuthority	0..1	n/a
Feature Name		featureName	0..*	n/a

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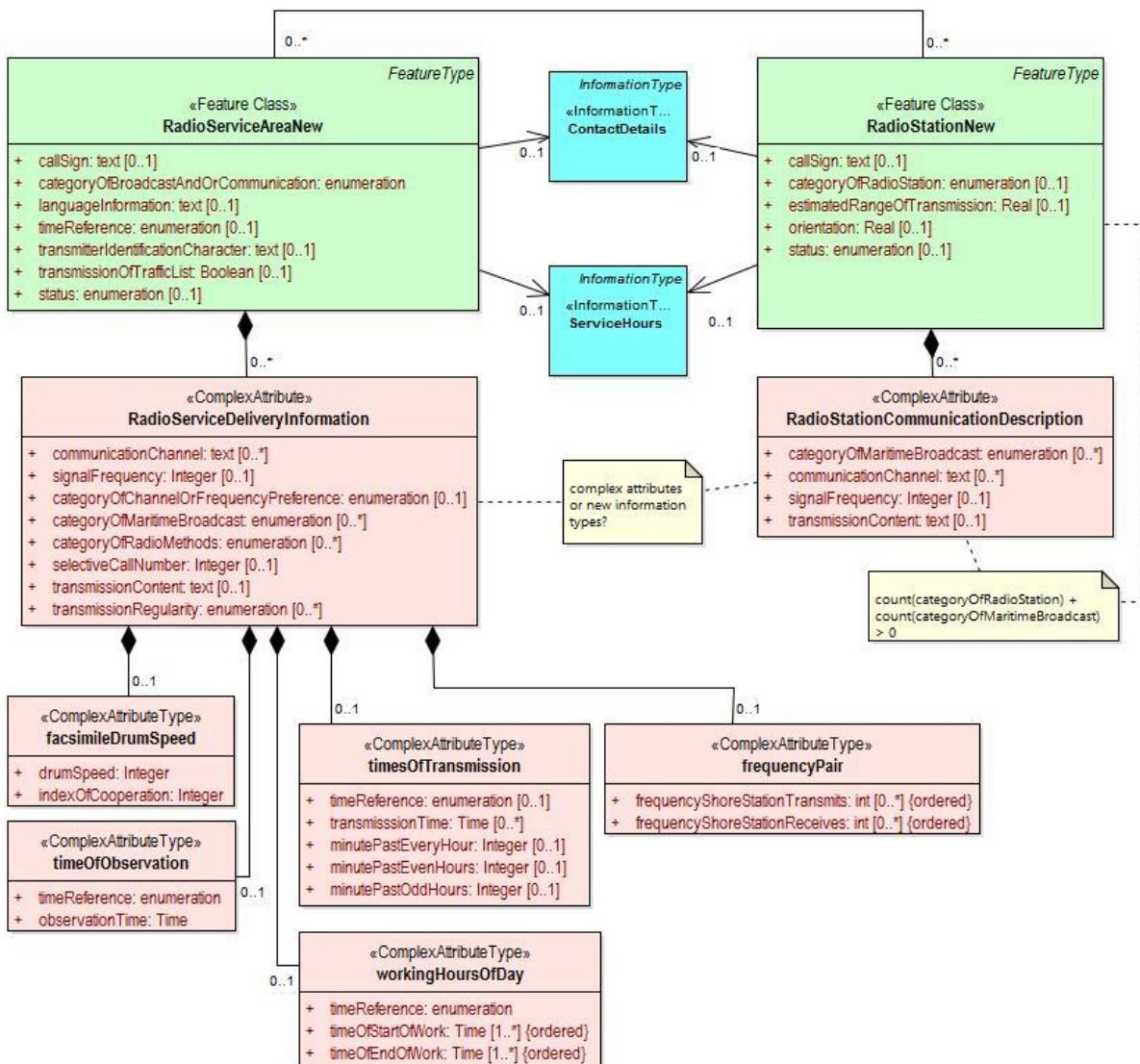


## New Model for Radio Services

The Radio Service test data sample has been independently mapped by two different NIPWG members. One major outcome was that the current construction is insufficient. Radio stations can provide multiple types of services, but it is not possible to assign more than one radio service description to a single radio station feature, or describe multiple kinds of service delivery in a single service area feature. That results in multiple service areas associated to one radio station and a long list of associations and inverted associations. Therefore, it is proposed to introduce a new construction which either employs complex attributes or information types. Complex types may be preferable since there is no apparent need to make delivery and communication information distinct objects in the dataset.

The basic difference from the old model is the addition of two repeatable complex attributes for radio service delivery information and radio station communication description. The existing simple and complex attributes were re-distributed over these new complex attributes and the feature classes. The result is to allow independent descriptions of different communications by the same station (using RadioServiceCommunicationDescription) and different services in a service area (using RadioServiceDeliveryInformation). The other complex types and the simple attributes are already defined on the NIPWG Wiki or in S-101.

The introduction of feature associations and inverted feature associations between the RadioStation and the RadioStationArea allows the assignment of several areas to one radio station and several radio stations to one area. (new diagram)



**Conclusions**

The harmonisation process between the various Product Specifications is ongoing. The NIPWG is waiting on responses from the S-101 development team.

**Recommendations**

The NIPWG is invited to take note of the report and to consider the further steps.

**Action required of NIPWG2**

The NIPWG2 is invited to:

- a. note this paper and act as appropriate.